AD-A031 434 NAVAL FACILITIES ENGINEERING COMMAND PHILADELPHIA PA --ETC F/G 13/2
FINAL ENVIRONMENTAL IMPACT STATEMENT, DREDGE RIVER CHANNEL: NAV--ETC(
SEP 76

UNCLASSIFIED NL

1 OF 6
AD
A031434

5

AD A031434

FINAL

SUPPLEMENT TO FINAL ENVIRONMENTAL IMPACT STATEMENT

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND

'DREDGE RIVER CHANNEL'

DDC
RECEIVED
NOV 2 1976
D

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

NAVAL SUBMARINE BASE NEW LONDON,

GROTON, CONNECTICUT

Copy available to DDC does not permit fully legible reproduction

VOLUME 2

Part 1

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

SEPTEMBER 1976

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER VOLUME 2, PART 1	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) (6) Final Supplement ~~to~~ Final Environmental Impact Statement, "Dredge River Channel: Naval Submarine Base, New London, Groton, ~~CT.~~" Connecticut. Volume 2, Part 1. Final Supplement.		5. TYPE OF REPORT & PERIOD COVERED FINAL
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Northern Division, Naval Facilities Engineering Command, New England Division, Corps of Engineers Jason M. Cortell Associates, Inc.		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Northern Division, Naval Facilities Engineering Command, U. S. Naval Base, Philadelphia, PA 19112		12. REPORT DATE (11) September 1976
		13. NUMBER OF PAGES (12) 504p.
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for Public Release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dredging
Dredged Material Disposal
Ocean Dumping
New London Disposal Site
Thames River
Environmental

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This volume contains a
A ~~review~~ of environmental concerns as they relate to proposed spoil disposal areas, are presented in Sections III and IV of this volume.

The seventy separate reviews of the Draft Supplement to the Final Environmental Impact Statement filed with the Council on Environmental Quality on 22 April 1976 generated 390 individual comments. These individual comments are responded to separately and are presented ~~in~~

(cont on 1473B)

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

S/N 0102-LF-014-6601

UNCLASSIFIED 392 004 LPG

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

cont fr p1473A

20. (Continued)

Section V of this volume.

Correspondence received during both formal and extended monitoring periods as well as transcripts from joint Army/Navy Public Hearings are reproduced in Appendix M. Appendix M is ~~continued~~ concluded in Volume 2, Part 2.

included.

1473B

S/N 0102- LF- 014- 6601

ACCESSION for
NTIS White Section ☑
DDC Buff Section ☐
UNANNOUNCED ☐
JUSTIFICATION
BY
DISTRIBUTION/AVAILABILITY CODES
Dist. AVAIL. and/or SPECIAL
A

DEPARTMENT OF THE NAVY

FINAL SUPPLEMENT TO

FINAL ENVIRONMENTAL IMPACT STATEMENT
"DREDGE RIVER CHANNEL: NAVAL SUBMARINE BASE, NEW LONDON, GROTON, CONNECTICUT"

DATED DECEMBER, 1973

VOLUME 2

DDC
RECEIVED
NOV 2 1976
D

"Prepared by Northern Division, Naval Facilities Engineering Command for Commander-in-Chief, U.S. Atlantic Fleet, in accordance with OPNAVINST 6240.3D in compliance with Section 102 (2)(c) of the National Environmental Policy Act of 1969"

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

TABLE OF CONTENTS

CONTENTS (Continued)

APPENDICES (Continued)

(V2 pt 2)

CONTENTS (Continued)

FIGURES

CONTENTS (Continued)

TABLES

I. INTRODUCTION

The *Draft Supplement to the Final Environmental Impact Statement* was submitted to the Council on Environmental Quality on 22 April 1976 and subsequently to agencies and public groups listed in the Summary, Volume I for comment. Notice of the availability of the Draft Supplement was filed in the Federal Register of April 30, 1976 (41 Fed. Reg. 18136). The closing date of the minimum period for public review and comment on the Draft Supplement was June 14, 1976 (45 days from the Federal Register notice of availability). An extension to this commenting period until 2 July 1976 was granted upon formal request as noted below to the following agencies:

United States Environmental Protection Agency, Region I
(letter request of June 10, 1976)

Connecticut Department of Environmental Protection
(telephone request of June 15, 1976)

New York State Department of Environmental Conservation
(telephone request of June 18, 1976)

National Marine Fisheries Service, NOAA
(telephone request of June 21, 1976)

Law Offices of Butzel and Kass
(telephone request of June 23, 1976)

Correspondence received during both the formal and the extended commenting periods is reproduced in Appendix M.

Joint Army/Navy public meetings, after appropriate notice, were conducted in Southold, New York and Groton, Connecticut on 9 and 10 June 1976 respectively. Complete transcripts of these hearings are provided in Appendix M.

II. SUMMARY OF COMMENTS

The seventy separate reviews of the Draft SEIS received by the Navy in oral or written form gave rise to over 390 individual comments. These comments are responded to individually in Section V of this volume. There were, however, several threads of inquiry common to many sets of comments. These common threads centered about two major areas of interest; the possibility of long -term, subtle, and chronic effects of dredged material disposal and the comparison between the New London Site and one alternative site (East Hole) which was favored, for one reason or another, by many of the commenters.

Questions raised about long term effects were generally of one of three types: Will the organisms that ultimately inhabit the dredged material stir it up, making erosion of the material more likely?; Will the various contaminants in the dredged material be taken up directly by organisms either at or near the pile and be concentrated in their tissues?; and, Will these materials be passed up the food chain, concentrating more and more at each higher trophic level, until they render unfit for human consumption some of the high level carnivores (such as bluefish and striped bass) that are taken in sport or by commercial fisheries? For a short-hand notation, these questions may be addressed as Bioturbation, Bioaccumulation, and Biomagnification. Each of these phenomena have been observed in the natural environment when it is disturbed by human actions and these concerns are legitimate. The Draft SEIS spoke of these concerns in paragraphs 5.40 to 5.60, but did not apparently provide sufficient information for many of the reviewers. Therefore, Section III of this volume provides a more detailed discussion of the literature on these phenomena, the conditions under which they have been observed, and the likelihood that they will be observed as a result of the disposal of Thames River sediments.

There were also several general groups of questions raised about the New London Site, East Hole, and the comparison of the two. In the Draft SEIS abbreviated data bases were presented on all fifteen of the possible alternative ocean disposal sites. Much information concerning East Hole and New London was simply summarized to allow them to be treated at the same level of detail as other sites, about which far less is known. This resulted, for some reviewers, in misunderstandings of the data on the two sites or in disagreement with the judgements of their relative physical and biological properties.

Misunderstandings of the data base stemmed, in some cases, from typographical errors in the SEIS and, in others, from a lack of sufficient definition of terms in the Draft SEIS. An example of the first type is the frequent comment that "East Hole contains sediments composed of 75% silt and clay." This was based, regrettably, on a typographical error in paragraph 6.284, where it was indicated that at East Hole:

> "(2) A central band of high sand/silt and clay ratio runs SW-NE through the site. Typical values are 75% silt and clay."

The second sentence of this description should have read:

> "Typical values are 75% sand/25% silt and clay."

This is a band of high sand/silt and clay ratio. A band containing 75% silt and clay would have been a band of low sand/silt and clay ratio. The Final Supplement contains an errata page listing this and other typographical changes to the Draft SEIS.

Lack of sufficient definition of terms caused misunderstandings primarily in the discussions of various current velocities. These had to do with the definition and use of the terms "threshold friction velocity", "erosion velocity", "tidal current velocity", and "wave-induced or storm-induced bottom velocity".

The driving forces for currents in the marine environment are three; tides, waves, and density currents. Tidal currents are those resulting from movements associated with the rise and fall of the tides. They are broken into ebb currents, which occur on the receding tide, and flood currents, which occur on the rising tide. Currents which are generated by waves are superimposed on this 12-hour cycle of flood and ebb currents. Wave-induced currents are caused by the passage of waves, which set up a roughly elliptical movement in the water as they pass over a spot. These currents are of short duration, being associated with the passage of a wave. The final driving force for currents is density differences in the water column. These density currents occur where water masses of very different temperature or salinity come into contact with each other. The currents produced by these density effects are normally so small as to be undetectable against the background of tidal and wave-induced currents. These current producing mechanisms are of particular interest in the SEIS because of the chance that they might produce erosive conditions on

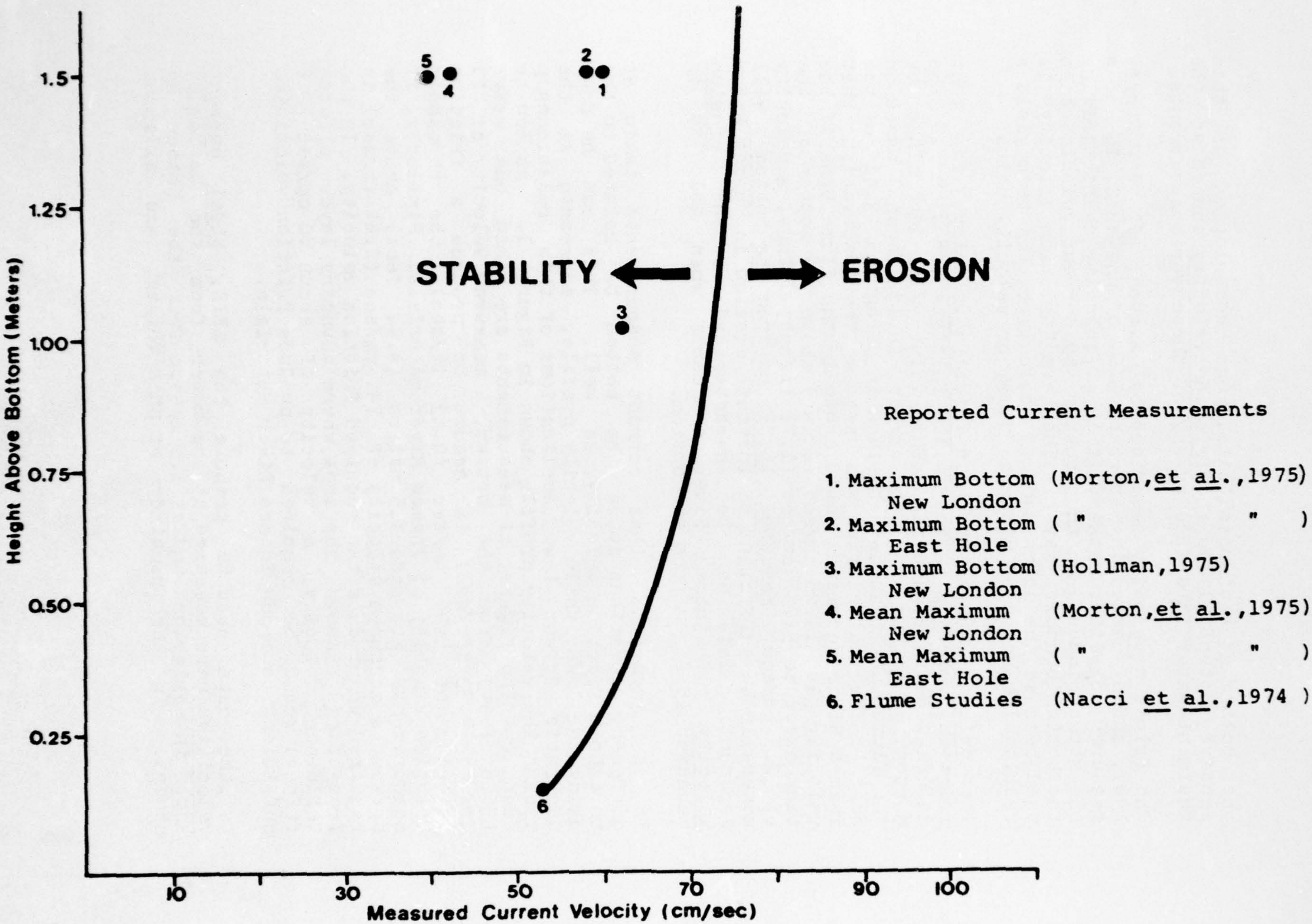
the bottom at a disposal site. One description of this erosive potential is the friction velocity caused at the sediment-water interface by any of these various currents.

The friction velocity described by Morton, *et al*. (ref. 140), and discussed in paragraph 3.61 of the SEIS, is not a measured velocity; rather, it is a quantity characterizing the stress induced on the bottom by current velocities in the bottom boundary layer. The term "friction velocity" is used because the units used to calculate the term yield a result with units of distance/time, or velocity units.

The critical or threshold friction velocity is that friction velocity which will initiate erosion in the material being considered. This value was determined by Morton, *et al*. to be 3.96 cm/sec (0.13 ft/sec) based on the flume tank results described in paragraph 3.61 of the SEIS. The calculation was based on the observation that Thames River sediments would erode in the flume tank if the velocity at 15.25 cm/sec (6 in.) above the bottom of the tank exceeded 52.5 cm/sec (1.72 ft/sec). Thus, a velocity of 52.5 cm/sec, measured 15.25 cm from the bottom, will generally be sufficient to initiate erosion in Thames River sediment. This can be characterized as the erosion velocity of Thames River sediments when velocity is measured 15.25 cm from the bottom.

It is important that current measurements taken at different elevations above the bottom be related to the threshold friction velocity, as well. This can be done using the logarithmic velocity profile, expressed as the Quadratic Stress Law. Applications of this relationship yields the velocity profile shown in Figure 1. As can be seen on the figure, if measurements are taken one meter (3.28 feet) from the bottom, a measured velocity of 71 cm/sec (2.33 ft/sec) is needed to produce a friction velocity of 3.96 cm/sec (0.13 ft/sec), the threshold friction velocity of Thames River materials. Similarly, if measurements are made 1.5 meters (4.92 feet) above the bottom, a measured velocity of 74 cm/sec (2.44 ft/sec) is required to produce the required friction velocity. In the free field, above the area where boundary layer effects influence velocity, a velocity of about 80 cm/sec (2.6 ft/sec) would be required to produce friction velocities sufficient to erode Thames River materials.

In the data used to prepare the SEIS, tidal current velocities were measured at one meter from the bottom by some investigators and at 1.5 meters from the bottom by others. In the remainder of this volume, care will be



EROSION VELOCITY vs HEIGHT for THAMES RIVER SEDIMENTS

G.

taken to specify, for each observation, the height above the bottom at which it was made and to compare it to the erosion velocity of Thames River sediments measured at that same height above the bottom.

Wave-induced or storm-induced bottom velocities were not measured at any site. They were calculated from available wave height and period information by the sinusoidal wave equation, as explained in paragraph 6.98 of the supplement. This equation is a "top down" method of predicting subsurface currents from surface waves and takes no account of boundary layer phenomena. Thus, the velocity resulting from this equation is a free field velocity and must be compared to the free field velocity of about 80 cm/sec (2.6 ft/sec) required to generate the threshold friction velocity of Thames River sediments. The remainder of this volume will maintain this distinction clearly.

Finally, some comments raised questions about net drift, which is the description of the speed and direction of movement over many tidal cycles. Net drift arises because ebb and flood currents are of different magnitudes and directions and do not exactly cancel each other out. Thus, over many tidal cycles, there is a net movement which can be determined. There are two methods of determining net drift. The simplest is the drifter study, where surface floats and bottom drogues are released at a site. These are marked with tags and are recovered when they reach land or when spotted by a boat. The surface and bottom net drift is then assumed to be the straight line from the release point to the recovery point. A second method of determining net drift is to use a group of current meter arrays at the site of interest. The direction and velocity records from these arrays can be used to determine both the instantaneous velocity and, by integrating the velocity data, the transport path over a tide cycle or several tide cycles. The drifter data are of most use when dealing with large-scale phenomena, such as mixing in the whole of Long Island Sound. Net drift from current meters is of greatest use in understanding the details of movement at and near a given site; it is micro-scale information, whereas the drifter results are macro-scale information. Both types of data are available for the East Hole and the New London Site and are discussed in Section IV, below.

Even with the misunderstandings of the data bases removed, there were many comments which raised disagreement with one or more of the judgments of relative suitability for dredged material disposal between the New London Site and East Hole. These took many different forms, but centered

on the ranking process described in paragraphs 6.359 through 6.426 of the Draft SEIS. Questions were raised on:

- The relative containment ability of the New London site.

- The relative containment ability of the East Hole.

- The influence of storm-induced bottom velocities at the two sites.

- The biological character of the two sites and the areas around them.

- The relative value of the various fisheries at and near the two sites.

- The constraints imposed by other uses at the sites, especially the FORACS Range at East Hole.

- The cost penalties involved in moving the disposal site from New London to East Hole.

A second group of questions offered suggested modifications to the ranking and weighting procedure itself. These included suggestions that:

- New categories of comparison be added. These were called variously "Distance", "Proximity", and "Dilution" and had as their thrust that disposal was more acceptable at sites further from the shoreline.

- The Biology and Fishing categories be disaggregated to separate site biology and fishing from biology and fishing in the vicinity of the site.

- The Other Uses category be dropped or that its weight be reduced to reflect the possibility of scheduling to avoid conflicts.

- The Regulatory category be dropped entirely from the ranking process.

- That other weighting schemes be applied to either the existing categories or to an amended list of categories.

In response to these groups of questions on East Hole, New London, and the comparison of the two, Section IV of this

volume has been prepared. In this Section, East Hole and New London are singled out for extremely detailed re-examination and the ranking system is reviewed. Such a review of the remainder of the relative containment sites would not be possible; there are only sufficient data on these two.

Thus, Sections III and IV of this volume amount to generic answers to many of the comments raised by the various reviewers. In Section V, where the individual comments are presented and responded to, many responses will refer to material presented in Sections III and IV. In this fashion, full answers can be provided to the comments without the excessive redundancy of repeating information required in many responses. Any reviewer concerned with the responses to his or her particular comments should read Sections III and IV before proceeding to Section V to avoid the necessity of back referencing for information.

III. LONG TERM EFFECTS

III.A. BIOTURBATION

The subject of bioturbation, that is the suspension of sediments as a result of feeding, burrowing, or motion of the biota, should primarily be addressed in terms of the effects produced by the bivalve Yoldia limatula and the Ampeliscidae. The magnitude of sediment suspension by Yoldia limatula was examined by Rhoads (ref. 298). In his study, Rhoads found rates of sediment reworking by this organism on the order of 5-6 liters per square meter per year in Buzzards Bay and 23-51 liters per square meter per year in Long Island Sound. The average density of Yoldia in Buzzards Bay used in the determination was 22 organisms per square meter. The densities for Long Island Sound are those for the Central Sound, determined by Sanders (ref. 185) to be 61 organisms per square meter at one station and 137 organisms per square meter at a second station. The level of activity by these organisms was temperature dependent and was optimal at 19 to 21°C.

The reported densities of Yoldia in New London Harbor, the New London Site, adjacent areas to New London Site, and East Hole are as follows:

	Y. limatula/m
Phase I area	192[1]
Phase II area	30[1]
New London Dump Site	0[2,3]
New London area	0[2]
East Hole (Hole and area)	3[4]

1. FEIS. Vol. 2
2. MACFC Informal Rpt. 42 (ref. 225)
3. MACFC, Reid (pers comm)
4. MACFC East Hole Final Report (Appendix N)

The Yoldia in Phase I sediment were patchy in distribution with the maximum amounts between the State Pier and approximately 2000 feet south of Pfizer's pier. The density in Phase II sediment is low. MACFC sampling in Long Island Sound (ref. 225) did not find this organism. MACFC Station 135 is located at the mouth of the river where 40 Yoldia per square meter were found. Station 136 of this same study was located at the New London Disposal Site and Yoldia was not found. Additionally, the present spoil monitoring studies have not found the bivalve on the

disposal site either. It appears therefore that nearly all of the Yoldia in Phase I sediment were killed during dredging and disposal operations and the same must be assumed for Phase II. Therefore, the amount of sediment reworking by Yoldia limatula on the dredged material mound should be minute indeed.

Throughout the monitoring period, Ampelisca vadorum and Leptocheirus pinguis has been found to be the dominant organisms in the faunal communities. It has also been suggested that the colonization of the dredged material by these amphipods could stabilize the surface and retard erosion. Since Pratt reports that ampeliscids build flat tubes which extend several centimeters into the sediment and a few millimeters to a centimeter above it (ref. 176) such a suggestion appears justified. Ampeliscids do not feed in the sediment as do many worms, but obtain food by either sweeping the sediment surface with the second antenna (as does Ampelisca agassizi), or by "whirling" the sediment into suspension (as do A. abdita and A. vadorum). However, the amount of sediment Ampelisca vadorum will suspend and subsequently may be transported by currents is very small.

Washout of tube mats in ampeliscid communities has received much research since Mills (ref. 290) originally characterized these communities as "inherently unstable". Such a general characterization however now does not appear to be justified. Washouts of the tube mat reported by Pratt (ref. 176) and Mills (ref. 289 and 290) occurred in sediments which are coarser than those found at New London. The sediments reported on were about 0.14 mm as compared to 0.0625 mm for New London sediments. In these coarser sediments, washouts are attributed to alteration of the sediment texture by the incorporation of fine materials among the tubes, reducing the average size of surface sediments. The New London sediments are fine and moderately well sorted and are generally more suitable for stable ampeliscid colonization.

Biernbaum (ref. 13) found that such washouts are not limited to the coarsest sediments, but are also related to the incorporation of fine material and population shifts during breeding. He also found that, while coarser sediments show substantial changes in fauna, the finest sediments are changed very little during the winter (because of stabilization by tubes.) Biernbaum's winter observations were conducted during January and February 1974. This is after the periods of maximum suspended material in the water column of November and December for

eastern Long Island Sound and Fishers Island Sound (ref. 13). Instability was associated with an alteration of grain size where finer materials are incorporated into larger sized sediment. This cannot take place at New London, where the dredged material is fine in size. Therefore, the sediment- ampeliscid relationship at the New London disposal site should be more stable than at other, coarser sediment areas. Rather than an increase in fine texture materials in the spoil, one could expect the reverse to take place where coarser fecal and sedimented materials will accumulate on the surface between the tubes and will result in an increase in the original grain size.

Burrowing worms such as <u>Nephtys incisa</u> can rework the sediment to a certain degree. This would aid in extending the redox discontinuity and thereby physically and chemically affect solubility of metals. Larger organisms such as the decapods and some demersal fish could also resuspend sediment. Some sediment will become part of fecal pellets which will settle faster than the parent sediment. The pellets can however be eroded easier because they do not consolidate well. However, the idea that the sum total of faunal activities is going to rapidly aid in the erosion of the spoil pile within a few years is grossly out of proportion.

Many of these same points were addressed by Dr. John B. Pearce in his testimony before the U.S. District Court, District of Connecticut on September 20, 1974. Dr. Pearce indicated that "...within a fairly short period...the dredging spoils are quite rapidly recolonized...And, as I've said, many of these form tubes and so on which will probably tend to stabilize the sediments."

III.B. NUTRIENT ENRICHMENT

Nutrients are those chemical forms (elements or compounds) which are required for the growth of plants either on land or in the water. Although many different nutrients are necessary for growth and health in plants, the primary nutrients are nitrogen and phosphorous compounds. If the supply of these materials increases, the growth of plant matter may increase. This leads to concern in aquatic environments because the rapid growth of microscopic plants can deplete the surrounding waters of oxygen. Elutriate testing and biological monitoring efforts at the New London Site and in the Thames River provide some insight into the possibility of such nutrient enrichment, and subsequent adverse effects, from dredged material disposal.

The results of the elutriate analyses of the Thames River sediments indicate high levels of nutrients as Total Kjeldahl Nitrogen (TKN), Total Phosphorus, and Nitrate (see Table 1). The potential release of such nutrients to the water column could lead to enrichment of the receiving waters. However, it is not valid to argue that the results of an elutriate test are applicable to dredge and spoil procedures that are being used at New London. First, in the elutriate test the sample is agitated, which allows total water contact with the sediments and resultant alterations of pH, Eh, dissolved oxygen, and solubility of metals and nutrients. This procedure closely mimics hydraulic dredging rather than clam shell dredging. Secondly the determination of Total Kjeldahl Nitrogen and Total Phosphorus requires an acid digestion which measures bound and unbound nutrients. It is not a valid estimate of the nutrients that are biologically available, since it includes those which are not biologically available. The best analysis of the enrichment potential is algal assay.

At the start of the monitoring and during monitoring, algal assay analyses were conducted by Dr. S. Y. Feng of the University of Connecticut (Volume 3, SEIS) who conducted algal assay analyses using elutriate obtained from River sediments and River water. The results of the assay did not correlate with chemical analyses of the elutriate nutrients; there was no discernable relationship between the nutrient levels measured in the water and the growth of algae in those same waters. Had correlation taken place (negative or positive) either total inhibition of photosynthesis would have resulted, or a tremendous bloom of phytoplankton would have been found. Chlorophyll (a) has been found to be slightly higher than background at the dredge barge but to return to background levels within 250 yards from the site. While light and dark bottle tests did

TABLE 1

ELUTRIATE ANALYSES OF THAMES RIVER SEDIMENTS

AVERAGE VALUE VS. POSITION IN CORE

	Tot. N ppm	Tot. P ppm	NO_3 ppm		Tot. N ppm	Tot. P ppm	NO_3 ppm
New London				East Hole			
Top	11.8	1.66	23.80	Top	11.90	1.56	4.97
Middle	14.8	1.51	6.60	Middle	15.90	1.82	6.57
Bottom	14.6	1.51	6.40	Bottom	14.50	2.78	5.50

(Samples Taken May 21-23, 1975)

	Tot. N ppm	Tot. P ppm	NO_3 ppm		Tot. N ppm	Tot. P ppm	NO_3 ppm
New London				East Hole			
Top	9.74	1.25	0.20	Top	10.4	1.10	0.10
Middle	20.28	2.00	0.20	Middle	22.1	1.97	0.10
Bottom	--	--	--	Bottom	--	--	--

(Samples Taken August 15-18, 1975)

not indicate the elutriate would inhibit photosynthesis, on one occassion lower levels of Chlorophyll a were found near the dredge barge. This would indicate that any release of nutrients to the water column was minimal and did not induce or reduce phytoplankton productivity. If productivity were to increase, one would expect it to be more pronounced within the riverine system due to higher nutrient levels rather than either the New London site or East Hole site. Therefore, while the elutriate analyses indicate large quantities of nutrients, the actual and realized biological potential for even moderate changes in primary productivity (as a measure of potential enrichment) is very low. While sediment nutrient concentrations have been higher in and near the dredged material, no significant changes in nutrients in the water column have been found in the area being monitored.

It does not appear that large amounts of nutrients are going to be released by the material at either site, and that the small, very small release will be controlled by chemical, physical, and biological processes, leading to no detectable effects, positive or negative, on primary productivity.

III.C. BIOACCUMULATION

Bioaccumulation is the concentration of a potential contaminant by sequential ingestion up the food chain. A material that is present in very small concentrations in the environment is incorporated into an organism (often a plant) that feeds directly from the sediment or water. This organism is then consumed by another organism that obtains the material contained in many of the direct consumers and concentrates the material in its tissues. This second organism is consumed by a third, and so on up the food chain, with the contaminant being concentrated at each successive level. Although any material can be concentrated in this fashion, special concern is addressed to those materials which might, at some elevated level in the food chain, damage or kill a consuming organism. Three such classes of contaminants are considered below; heavy metals, oils, and polychlorinated biphenyls (PCBs). The heavy metals (particularly cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, and zinc) are toxic in relatively small concentrations and have received much attention over the past decade. Oils are primarily of concern in dredged material disposal in their capacity to taint shellfish meats, making them undesirable for human consumption. PCBs have proven recently to be of considerable concern, as well. They are not readily broken down in the environment and have accumulated in some organisms, especially near industrial sources of these compounds.

III.C.1. <u>Heavy Metals</u>

Biological impacts associated with heavy metals may be addressed in several contexts . First it may be appropriate to review the various reserves of metals that are contained in sediments. Keeley and Engler (Ref. 286) considered the availability of many chemical parameters including nutrients and metals in relation to their location in the sediment. The sediment interstitial water contains the most immediately available forms of nutrients, minerals, metals, and gases. There are many chemical forms in the interstitial water which are dissolved or dissociated. Some metals may be in the reduced or oxidized form. There are also many ionized cations such as calcium, potassium, sodium, magnesium, and others; as well as the nutrients such as the nitrogen compounds and phosphates. Upon disturbance of the sediment (by dredging for example) the chemical forms in the sediment interstitial water are immediately available to the water column.

The sediment also contains chemical forms such as bases, ammonium, and the heavy metals which are ionically bound (adsorbed) to the charged mineral and organic particles. The majority of these forms are cations (positively charged) because of the negative (anionic) nature of available bonding sites on the sediment particles. There is a constant exchange of constituents between the interstitial water and the bound chemical forms. Once the chemical forms in the interstitial water are depleted because of washout or dilution through dredging and disposal, the bound portions serve as reserves for longer term release in trying to obtain equilibrium with the new interstitial water or water at the sediment-water interface.

Redox reactions are another mode of release for chemical forms, particularly the heavy metals such as copper, zinc, nickel, cadmium, mercury, and cobalt. Iron and manganese are particularly common and quite reactive. These metals form insoluble and stable precipitates (either oxides or hydroxides) under oxidizing conditions and go into solution under anaerobic or reducing conditions. In anaerobic sediments, free of or with very little sulfide, these metals are soluble and if disturbed or dispersed into aerobic waters become insoluble. However, when sufficient concentrations of sulfide are present many of these metals are bound to the sulfide. When oxidation takes place the metals are then released from the sulfide but then oxidized as before into an insoluble complex. Iron, for example, complexes with phosphorus and acts as a control on this nutrient. The rate of reaction varies depending on the availability of oxygen at the time of oxidation of the sulfide.

Another potentially available suite of chemicals is that associated with or part of the organic fraction in the sediment. An example is partially decomposed waste products which are a large source of nutrient cations and anions. Leaf litter, marine grasses and macroscopic algae and faunal organisms are other examples. Digestion by larger organisms or saprotrophic decomposition (fungi, bacteria) are the main biological processes in the decomposition. As discussed below, these releases are different in aerobic (oxygen rich) environments and anaerobic (oxygen poor) environments.

The last source of chemical forms are those that are so totally bound that release only takes place under long-term geochemical weathering. Keeley and Engler (ref. 286) classify this as the "Residual Phase" and the chemical

forms are found in the crystalline lattice of the sediment particles themselves. These are the least important during long term biological processes since these forms originate from the lithosphere and are not associated with pollution loads.

The next major item for discussion is the method of release for the nutrients and metals. Decomposition of organic material results in the release of ammonia and phosphate. Under oxidizing conditions the ammonia undergoes nitrification to nitrite and then to nitrate and proceeds through the nitrogen cycle. Under reducing conditions the ammonia will not be oxidized but will continue to accumulate. The phosphate under aerobic conditions may be complexed with iron and manganese or remain soluble under anaerobic conditions. However not all phosphate is complexed and some is immediately biologically available.

The reactivity of the heavy metals varies. Chen *et al.* (ref 274) examined the controlling mechanisms for the transport of metals using actual dredged material in laboratory tests designed to simulate disposal environments. Their findings are extracted below.

Controlling Mechanisms for the Transport of Trace Metals in the Sediment-Water Interfaces

Oxidizing Conditions

Most trace metals, with the exception of silver, chromium, and mercury, were released under oxidizing conditions. The possible mechanisms for the increase of soluble forms of trace metals in the interfacial water are:

a. diffusion from interstitial water

b. desorption from clay minerals or other solid forms

c. chemical reaction, i.e., oxidation of organics and sulfides

d. ion-exchange

e. dissolution

f. complexation

g. biological actions

In long-term experiments like this, physical and biological effects are likely to be minor sources of soluble trace metals. The main release phenomenon is probably caused by complex formation. From thermodynamic equilibrium calculations, it can be found that under oxidizing conditions the soluble species of trace metals may be tremendously increased from their free ion forms to complex forms.

The main soluble forms of cadmium come from $CdCl_2°$, $CdCl^+$, $CdCl_3^-$, and Cd^{+2}. In addition, the presence of carbonate, ammonia, and organic substances may form additional soluble complexes. This may explain the increase of Cd under oxidizing conditions.

The concentration of soluble mercury may also be controlled by chloride complexes ($HgCl^{-2}$, $HgCl_2°$, and $HgCl_3^-$). But the release phenomenon of mercury was not quite as significant in this experiment. It may be very likely that the solubility of mercury was controlled by sulfides in the sediment. Despite the prevailing aerobic conditions in the water column the diffusion of O_2 from the water column in this quiescent system may have been too slow or unable to oxidize the high oxygen demand sediments beneath the surface. Due to the releatively slow reaction between mercuric sulfide and oxygen, the mercuric sulfide may remain the predominant solid phase in the sediment. Otherwise, the low concentrations of soluble mercury are not compatible with equilibrium calculations of chloride species.

Under oxidizing conditions, the soluble forms of copper in the interfacial water may be mainly controlled by ammonia, carbonate, and hydroxide. For lead, besides carbonate and hydroxide complexes, the chloride complexes also play an important role. For zinc, the main forms are probably Zn^{+2}, $ZnCl^+$, $ZnSO_4°$, $ZnCl_2°$, $ZnOH^+$, and $ZnCO_3°$ (aq).

The Fe (II) and Mn (II) compounds are thermodynamically unstable under oxidizing conditions and oxidize to less soluble (FE(III) and MN(IV) species. For this reason, the iron and manganese concentrations show no significant increase. The chromium concentration in the interface showed no significant change, probably as a result of the lack of soluble complexes and the low solubility of the hydroxide. A possible explanation for the undetectability of silver is the

extremely low solubility of AgS and AgCl. Also, silver may be strongly adsorbed on sediments so that the release is too small to detect. The most likely explanation for the lack of silver release is the simple solubility consideration. Using a chloride concentration of 2% and silver chloride solubility product of 10^{-10}, it can be shown that the saturated silver concentration under these conditions would be about 0.02 μ g/l, the detection limit of the instrument.

The metal complexes which account for the high concentration under oxidizing conditions are not only from chloride, hydroxide, carbonate, or sulfate species. Others such as organo-complexes, ammonia compelxes, etc., may also account for the soluble forms in this experimental system. Since most complex formation constants are lacking, especially organo-metallic complexes, and given the complexity of the experimental system, it is not possible to propose a fixed model with definite figures to explain the release phenomena.

Reducing Conditions

In a reducing environment, with the exception of iron and manganese, most trace metals were decreased to an extremely low value at the beginning of the contact period. However, the concentrations of some of these metals (e.g., cadmium, copper, mercury, nickel, lead, and zinc) increased again as time passed. It is suggested that the deposition effect during the beginning of the contact period is a combined result of metallic sulfide species are more stable in comparision to most of the chloride, carbonate, or other species. The subsequent increase of trace metals may be primarily due to the following:

a. formation of metallic sulfide complexes

b. formation of organo-metallic complexes

c. diffusion from interstitial water

d. release of trace metals from the transformation of the highly insoluble hydrous metal oxides to the more soluble Fe (II) and Mn (II) compounds; and slow precipitation of metal sulfides due to kinetic effects

Among these factors, the equilibria of sulfide species may be the most important factor in determining the metal concentration in the interface for several species. On the other hand, organo-metallic complexes may play a role in cases where soluble concentrations exceed equilibrium calculations of metal sulfide complexes.

Slightly Oxidizing Condition

In general, the concentrations of trace metals in interfacial seawaters under slightly oxidizing conditions were between the oxidizing and reducing conditions. Under oxygen-deficient conditions, due to the continued upward diffusion of dissolved sulfide from the sediment, the dissolved sulfide may precipitate some of the dissolved trace metal species to metallic sulfides, and decrease the trace metal concentration in soluble phase.

To be more specific about transfer of trace metals, the conditions for release of some elements may be discussed.

Cadmium may be significantly released only under oxidizing conditions. In many of the elutriates from the berthing area sediments, high concentrations of cadmium were found. These concentrations could act as a reservoir tending toward equilibrium with over-lying water (ref. 274).

While clay sediments generally contain higher copper concentrations than other sediment types, the quantity in the sediment does not appear to represent a large reservoir for release since the metal is actively scavenged from the water (ref. 274). The release of copper is directly related to increasing oxygen concentrations.

In the reduced state, chromium is relatively insoluble; however, at circum neutral pH levels this metal may go into solution (Pratt & O'Connor, ref. 297). Chen et al. (ref. 274) found no significant change in concentration of this metal under any redox conditions.

As in fresh water environs, iron is soluble under reducing conditions and insoluble under oxidizing conditions. That is to say that when anoxic sediments become oxic the release of iron to the overlying water becomes minimal. However, under anoxic conditions iron is released in soluble form.

Mercury is known to form chloride complexes and like cadmium and copper, greater (but not significant) release takes place under oxidizing conditions.

Manganese behavior is similar to that of iron where considerable release takes place under reducing conditions, but very little in well-oxygenated environments.

The picture on nickel varies but generally more nickel is released under oxidizing than reducing conditions. In sediments such as those found in Phase II Thames River dredging, nickel will gradually be released.

The transport of lead is similar to that of cadmium and hence is transported greatest under oxic conditions.

The clayey-silt sediment found in the Thames River may be expected to release zinc rather quickly under aerobic conditions. Transport of silver is considered negligible.

The foregoing discussion has presented the various locations for heavy metals in the sediments, factors controlling their transfer in the sediment-water interface under oxidizing to reducing conditions, and a discussion of the mobility of some specific metals. While the redox for Phase II sediment is not known, it is assumed the material is anaerobic and contains moderate levels of sulfide. The solubility of many metals under sulfide conditions varies. Lead, nickel, copper, zinc, mercury, cobalt, and silver remain relatively fixed (depending on the sulfide concentration). However, ferrous and manganous sulfide are quite soluble. When dredging takes place, the physical disturbance will cause a small percentage of the sediment and sediment interstitial water to be oxidized in the water column. However, rather than have a free release take place, the metals mobilized from the sulfide complex upon oxidation will then be rebound by a newly formed ferric hydroxide. Lee _et al_, (ref. 120) report that due to the variety of forms in which heavy metals are found in the sediment, "there would likely be little or no relationship between the bulk heavy metal content of a sediment and its impact on water quality during dredging and dredged materials disposal." These authors also report that "dredging of anoxic sediments would result, upon disposal in the water column, in the formation of ferric hydroxide, which would scavenge many heavy metals from natural waters."

The sulfide release and ferric hydroxide formation will take place on a very limited scale at the dredging site and

to a greater degree at the disposal site. The upper sediments at the berthing areas are relatively unconsolidated and may be subject to greater exposure in the plume upon disposal. Once on the bottom, consolidation will begin anew and a limited amount of biological impact on the metals will take place (through burrowing and redox discontinuity extension). In the New York Bight, for example, concentrations of heavy metals in overlying waters have been found to exceed toxicity levels for many marine organisms. Analysis of heavy metal concentrations in sewage sludge dumped in the New York Bight showed that chromium levels are 150 times higher, lead 300 times higher and copper 2,000 times higher than what they are in uncontaminated areas of the Hudson Gorge. However, due to the mulitplicity of wastes and spoils dumped at the New York Bight, a parallel should not be drawn with the Thames River situation. It is not correct to imply that the sum total of the chemical constituents found in the elutriate testing of the berthing area sediments will be released upon disposal. The confusion that besets the lay person about these test results is based on one of the inherent problems in conducting an elutriate analysis. That is, the chemical reactions which take place regarding oxidation and reduction reactions may or may not be representative of natural occurrences.

Much has been written about biological magnification of metals. On one occasion bioaccumulation is reported while it is found not to take place on another. Phelps (ref. 296) has found that polychaetes who feed at the sediment surface concentrate iron but not zinc; but the deeper feeding organisms concentrate more zinc. Changes in mantle and gonadal tissue of oysters will take place following exposure to 0.1 - 0.2 ppm of lead. Oysters exposed to 0.2 ppm of lead for 10 weeks concentrated 328 ppm of the metal within their tissues (ref. 299). Copper concentrationsof 0.1 ppm is lethal to soft shell clams over a period of 10-12 days and will also cause a reduction of photosynthesis in kelp. Copper levels of 0.05 ppm will kill polychaete worms in 4 days.

Cadmium has been found to severely limit the growth and survival of oysters (ref. 302). Many molluscs vary in their response to different metals. Selective accumulation of different metals by different organisms and in various tissues has been found (ref. 298). For example, Gordon, Rhoads, and Turekian (ref. 284) noted that the concentrations of copper and zinc in Mulinia and Yoldia were much less than the copper and zinc levels in the sediment. Yet, Pesch (Personal Communication) has reported finding the tissue concentrations of several metals in the ocean

quahaug, Arctica islandica, to vary in relation to position to the dredged material mound at the Rhode Island Sound Disposal Site. More detailed investigations are underway, but as of this writing have not been completed. Much of the metals work on marine organisms has been conducted on mercury. However, the biological impact on mercury is unlike that of other metals. Mercury can be biologically changed to a more toxic methyl-mercury form. High concentrations of this metal have been found in top carnivores such as swordfish.

For plankton-eating fish, the likely route for bioaccumulation of metals is phytoplankton - zooplankton - fish - fish. For bottom feeding fish such as flounder, the route would most likely be sediment-amphipods and worms - fish. The concentration of metals in a carnivore from the New London dump site has been evaluated. Since the cessation of Navy Phase II dredging, lobsters have colonized the area in which the dredged material was deposited. They are taken by commercial fishermen, and tissue analyses have been carried out by MACFC. The analyses reveal no systematic changes in heavy metal content of New London lobsters between the period before disposal began and the summer of 1975 after Phase I disposal had been completed. Comparisons of these concentrations with data on lobsters taken from off-shore areas from the northern coast of Maine to Maryland (ref. 294) indicate the New London and New Haven lobsters do not contain higher levels of silver, cadmium, or zinc in their muscles. The comparison also indicates New Haven lobsters contained higher levels of copper in the tail muscle, while New London dumpsite lobsters had lower copper concentrations in the same tissue. Zinc levels were well below the offshore lobsters for both New London and New Haven animals. It should also be pointed out that there is a large variability in concentrations between animals from the same location, particularly in copper concentrations. Additionally, when comparing data of claw and tail muscles combined to data of either muscle separately, the claw appears to contain higher concentrations of some metals with copper among them.

While the impact of dredged material disposal on the biotic environment may be readily measured in terms of the concentrations of metals found in tissues, the realized impact is better manifested in terms of survival, growth and fecundity of the biota. Pearce (ref. 166) indicated that amphipod populations in the New York Bight disposal areas were sparse, but did increase as the contamination

decreased. Unicola irrorata and Monoculodes edwardsii were found in such scant numbers in the polluted zones that they were present probably as a result of water currents. In the Bight area during the reproductive months of May and June, megalops larvae have been noted at 7 per 0.1 square meter. However in the polluted and very polluted zones 100 percent mortality of larval and juvenile stages takes place. No such mortality has been observed at New London. As has been found at the Rhode Island Sound site, however, recolonization could proceed slower with Phase II sediments than with Phase I sediments.

Indirect evidence for low levels of effect can be had from the shallow area in the northern part of the New London site. While the exact source of the "relic" spoil pile is not known, reports of its age (FEIS, Appendix J) tend to indicate its formation about 1970. If this is correct, organisms colonizing this dredged material pile do not seem to have suffered. Therefore, while it is worthwhile to consider the subtle long-term impacts of disposal of the Phase II sediments, any conclusions so derived must be speculative and non-quantifiable.

As an alternative measure to evaluate the subtle long-term impacts, a discussion of the magnitude of impactable resources seems appropriate. Since it has been found that the dredged material at New London has not spread to the northwest or Fishers Island Sound, the impactable resources at the New London Site are those in the immediate area of the site itself. If any economic benefits exist on the site, they are the lobster and demersal fish. The lobsters have not been found to be contaminated with metals and due to the habitat range of the finfish it is unlikely they will be found contaminated, either. Finfish range further than lobsters and require different habitats at different points in their life cycle. Thus, they are less likely to be exposed to one site for a long period of time.

At East Hole, there is a potential overwintering area for lobsters, a valuable commercial finfishery at the proposed site as well as surrounding areas, and a commercial shellfishery in surrounding areas. The eastern Long Island Sound lobstering grounds are clearly 'downstream' of the proposed site. The higher density of amphipods and their demonstrated significant value in the food chain for the fish make long term impacts somewhat more likely. Additionally, the demonstrated impacts on the ocean quahaug (Pesch, Personal Communication) have implications for disposal at East Hole; there are beds of this harvestable shellfish nearby.

III.C.2. Oils

The impacts of oil-based hydrocarbons on the biota are being discussed separately from polychlorinated biphenyls. Much of the toxicity of oil is derived from the volatile fraction. Since much of the oil contained in the Thames River sediments is old, it is probably depleted of volative aromatics.

It is difficult to draw a relation between the findings at the Rhode Island Sound site with Providence River dredged material, the West Falmouth oil spill and its impacts and the Navy Phase II sediment because of the lack of gas Chromatograms from all the locations at the time a particular event was noted. Nonetheless, the subject is discussed here particularly in view of the experience at the Rhode Island Sound site with the tainting of Arctica islandica, benthic recolonization, and indirect impacts on the organisms.

When Providence River material was being disposed at Brenton Reef it was noticed that the meat of ocean quahaug harvested in the area was discolored. The meats also had an oily taste. Specific data concerning the immediate cause and effect relationship are not available. However, the Environmental Protection Agency has funded a study to investigate total hydrocarbon concentrations in the ocean quahaug as they relate to the Rhode Island Sound disposal site and surrounding areas. Preliminary information from this study indicates that with the exception of a small 2km band around the site, there may be little correlation between total hydrocarbon concentrations in the sediment and concentrations in Arctica islandica. Additionally, the hydrocarbon concentrations gradients are stronger in sediment than in the quahaug.

Since the ampeliscid amphipods are considered to be sensitive to oil pollution, recolonization by these organisms in a sediment containing oil could be slowed. Slow recolonization by the amphipods has been reported at the Rhode Island Sound Site. Several years after spoil disposal at the Rhode Island Site, tolerant polychaetes, molluscs, and sea anenomes were found at the center of the spoil mound. Ampelisca agassizi, which is characteristic of Rhode Island Sound, was found at the edges of the pile. Such a sequence could be expected at New London, in areas where pierside sediments form the surface of the ultimate spoil pile. Initial colonization may actually take place by polychaete worms, but the full suite of organisms could be expected to follow after a few years.

Pearce (ref. 166) found that lobsters and crabs exposed to hydrocarbon contaminated sediments from the New York Bight had developed necrotic lesions on the exoskeletons. Blumer, et al. (ref. 282) evaluated the interaction between marine organisms and oil pollution. While their study found that oil pollution affects the feeding and behavior of the American lobster, the data are only applicable to recent oil spills. Because the Phase II sediments are probably depleted of volatile aromatics the severe toxicity noted after oil spills is not expected. However some gill clogging might take place.

Finally, it should be noted that oil tainted shellfish meats have not been reported from shellfish beds in the New London area (Feng, Pers. Comm.), and closure of the beds is a result of bacterial contamination. Even if disposal of the Phase II sediments does not result in shellfish tainting at the New London Dumpsite, this does not constitute a guarantee that disposal at East Hole would not result in contamination of shellfish at that location, or resources at The Race, where the more sensitive Arctica islandica is found.

III.C.3. Polychlorinated Biphenyls

Chlorinated hydrocarbon pesticides such as DDT and its analogs have been researched extensively and biological magnification through the food chain has been well documented. Of particular concern in this discussion is the form of chlorinated hydrocarbons known as polychlorinated biphenyls (PCB's). PCB's are rapidly emerging as one of the most controversial of the recent pollutants. PCB's are used extensively as platicizers in industry and primarily as insulating fluids in electrical and heat transferring equipment.

Sedimented oils will concentrate large amounts of these non-polar compounds thereby enhancing the likelihood of bioaccumulation. Testing of Thames River shellfish has not shown any effects of this type. Fulk, et al. (ref 76) have studied the release of pesticide materials to the water column during various dredging and disposal operations; they found that the role of oil and grease was much more important than that of suspended solids in describing the concentration of pesticide material remaining in suspension. The bulk pesticide concentrations (DDT) in channel and berthing area sediments were found to be almost entirely less than 0.1 ppb. Additionally, the average bulk sediment concentration of PCB is 2.33 ppm (range 0.5-11.0

ppm) for the berthing areas. PCB's have a low solubility in water (0.24 mg/l for Aroclor 1016). Chen et al. (ref 274) did not observe chlorinated hydrocarbons in soluble form but they were associated with organic and inorganic particles of 8 microns or less.

Very high concentrations of PCB have been found in sediments behind dams on the Hudson River. Sediment at Fort Edward N.Y. was found to contain 232.9 ppm PCB but above the Thompson Island Dam (west) 996 ppm of PCB were found (Mt. Pleasant Pers. Comm.). Sediment samples from other locations in the Hudson River closer to the source of PCB discharges revealed concentrations of Aroclors 1016, 1221, and 1254 as high as 1850, 1720, and 137 ppm respectively (ref. 295). There are a number of point and non-point sources of the PCB's, and a wide range of concentrations are found. While the majority of the concentrations were much lower, one concentration as high as 8.47 ppm was found at an industrial discharge. Municipal discharges and surface runoff also contribute substantial quantities. Concentrations of PCB Aroclor 1016 in River water below the main industrial discharges ranged from 3 ppb during 1974-1975 winter months to a low of 0.06 ppb in August 1975. The levels of PCB's in various aquatic organisms from the Hudson have been tested as well. There is no doubt the PCB's are concentrated in the food chain. The degree of concentration depends on whether the organism is a predator or forage species of fish and the age/size class. Bottom feeding organisms have been found to contain very high concentrations. Striped bass because of their trophic level have been found to contain more PCB's than shad. It is apparent, however, that the Hudson River situation is unique and very dissimilar to the Thames River spoils. (Fredette and Mt. Pleasant, personal communication).

III.D. Habitat Alteration

In spite of its faunal similarity to surrounding areas the habitat at the New London dumping ground must be considered artificial. As the SEIS has demonstrated, the development of a 'climax community' will take many years to accomplish, barring further disposal. In the end it may be expected this area will provide a greater habitat for crabs and lobsters in particular than the area once did. Additionally, since the dredged material mound has been found not to be spreading to shoal areas to the northwest and Fishers Island Sound, the question of habitat alteration is narrowed considerably. If the material were to very slowly move toward the southeast and end in the

central area of Long Island Sound, such movement of fines and settlement could barely be perceptable over the background rate of sedimentation. Such a slow rate would not affect the existence of present benthic fauna and flora. For the mound itself, continued disposal would bury benthic habitors at the disposal site and colonization would begin anew.

The proposed site at East Hole is unpolluted (within the strict sense of the term) and supports a natural assemblage of faunal organisms. Dredged material disposal at this location would disrupt the present fish habitat, make parts of the area physically unfishable, and could decrease the economic value of this fishery. There is no reason to indicate that lobster habitat would not be improved. However, the area is not presently potted and it is doubtful if it would be preferentially fished in the future over the present Race - Fishers Island stocks. If the dredged material could be placed in such a manner as to avoid ocean quahaug beds around the Hole, these shellfish would not be severly impacted by the presence of the sediment. However, the possibility of contamination of the meats is a potential risk. Dispersal of the spoil material from East Hole into the Race and Long Island Sound might also take place. It is unlikely, however, that the sedimentation rate will impact on existing fauna and flora of Long Island Sound.

Therefore in terms of habitat alteration at East Hole, demersal finfish will be severly impacted. Impacts to the commercial shellfish beds will be more chemical in nature.

EAST HOLE VERSUS NEW LONDON

The Draft Supplemental Environmental Impact Statement presented brief summaries of information on fifteen different alternative open water disposal sites for the disposal of Thames River dredged material resulting from Navy projects in the River and at the NAVSUBASE. The data bases for these sites ranged from the very general, such as that available for the Munitions Site, to the very detailed, such as that available for the Rhode Island Sound Site, East Hole, and New London. Data on the latter group of sites were presented in capsule form, with references to the literature for supporting information, so that there would not be an excessively lengthy treatment of one or more sites and very brief treatments of the remainder. This was felt to be appropriate for the task at hand, which was to compare these fifteen sites and to select from among them one which was suitable for the proposed disposal effort.

Since the publication of the Draft SEIS, the comments received have indicated that a number of reviewers consider East Hole to be preferable to the New London Site and wish to see a more detailed comparison of the physical and biological properties of these sites and the areas around them. Additionally, the original ranking process used in the Draft SEIS was felt by some reviewers to have unfairly penalized East Hole in relation to New London.

This Section responds to those comments by presenting a much more detailed description of the two sites. Additionally, comments received from local fishing groups (Comments 50 and 51) provided information focusing on the fishery at East Hole, originally underestimated because of reticence among these fishermen to reveal the locations of their favorite fishing grounds in other than general terms. This corroborated the originally-assigned ranking of the East Hole fishery in paragraph 6.391 of the SEIS.

The format of this Section parallels the format of Section 6 of Volume 1 of the SEIS. Information is first presented on the individual inventory elements at each of the sites, including bathymetry, sediments, currents, biology, human uses, regulatory considerations, and disposal costs. This is followed by a discussion of the ranking process, and suggested modifications to it. Finally, East Hole and New London are ranked in comparison to each other.

IV.A. BATHYMETRY

IV.A.1. East Hole

The bathymetric survey of the East Hole (Figure 2) Morton et al., (Appendix N) was conducted in August, 1974, using a 65 foot boat from the Naval Underwater Systems Center. The shore transponders were surveyed into position at the lighthouse on Watch Hill Point and at Prospect Hill on Fisher's Island. A 50 meter lane spacing was maintained by running constant ranges on the Prospect Hill Station. Depths measured in the field were corrected for stage of tide, correlated by time with ships position and plotted on the X-Y navigation plot.

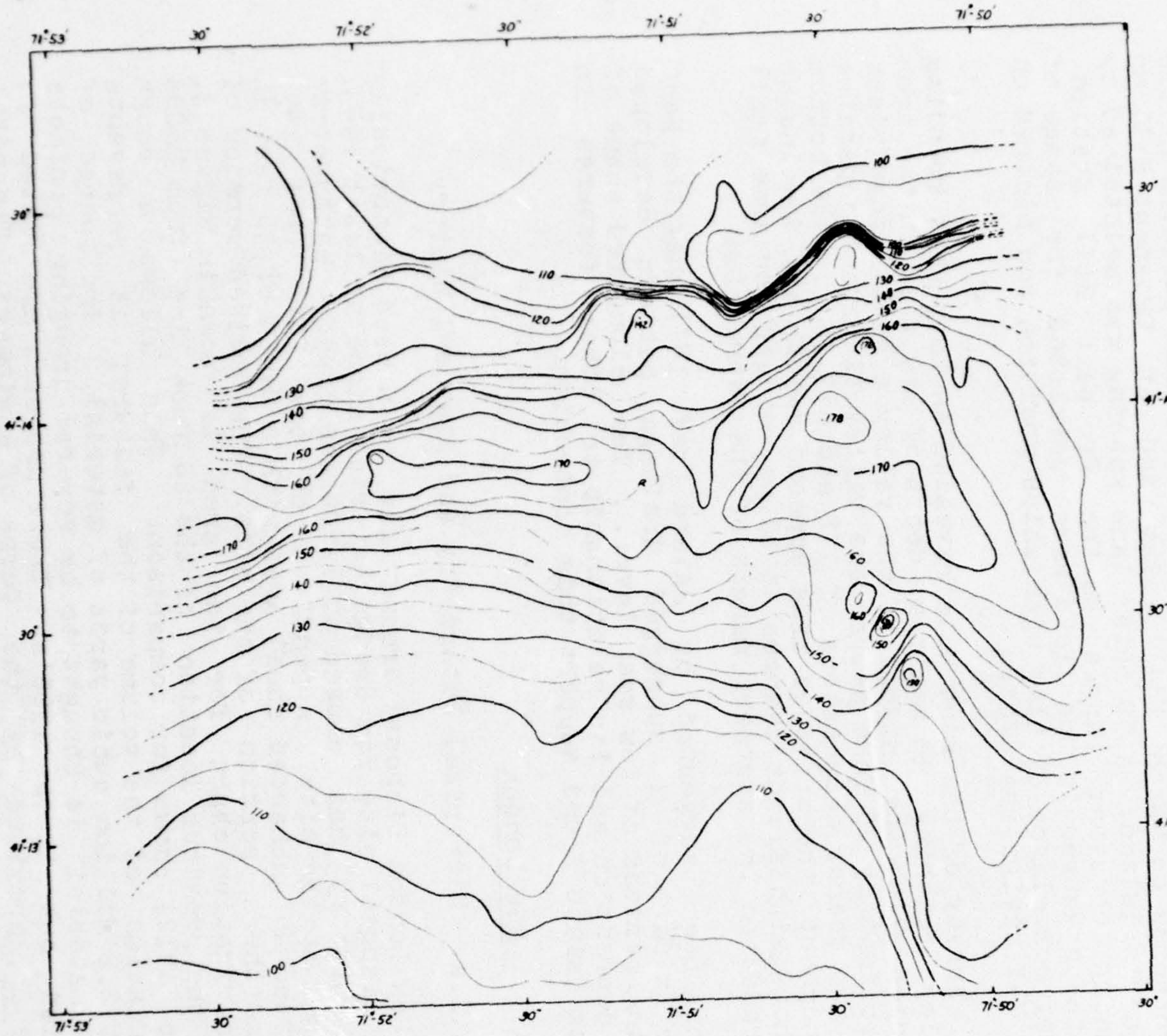
The survey of the East Hole revealed an East-West trending valley reaching a maximum depth of 179 feet in the area studied. In the middle of the valley a small ridge rises approximately 20 feet above the valley floor and separates the two deeper depressions of 178 and 179 feet. The bottom throughout the surveyed area appears smooth and continuous without significant changes in slope, except for some small terraces on the southern margin of the depression.

It has been suggested by Savard (ref. 187) that the East Hole is part of a submerged drainage pattern developed during periods of low sea level. The elongated shape of the depression and its relationship to other features in Block Island Sound support this contention.

IV.A.2. New London

IV.A.2.a. Historical Bathymetry and Disposal History

The New London Disposal Ground has been used historically as a disposal site for dredge material since at least 1943. This history has caused at least one major bathymetric change at the site. Appendix K of the FEIS (ref 249) reported an uncharted shoal area with a depth of 36 feet in the northern portion of the site. The revised version of the navigation chart for the area is shown in Figure 3, with the previous location of the 60 foot line (from USCGS chart 1212) shown for comparison. This allows a rough calculation of the volume of the feature; it represents about 2.2 million cubic yards of material. The source of this material is thought to be several dredging projects carried out in the 1960's. These projects are listed in Table 2, provided by the Corps of Engineers. The total disposal amount listed there is almost 3.4 million cubic yards. Since point disposal was not practiced at the time



EAST HOLE BATHYMETRY

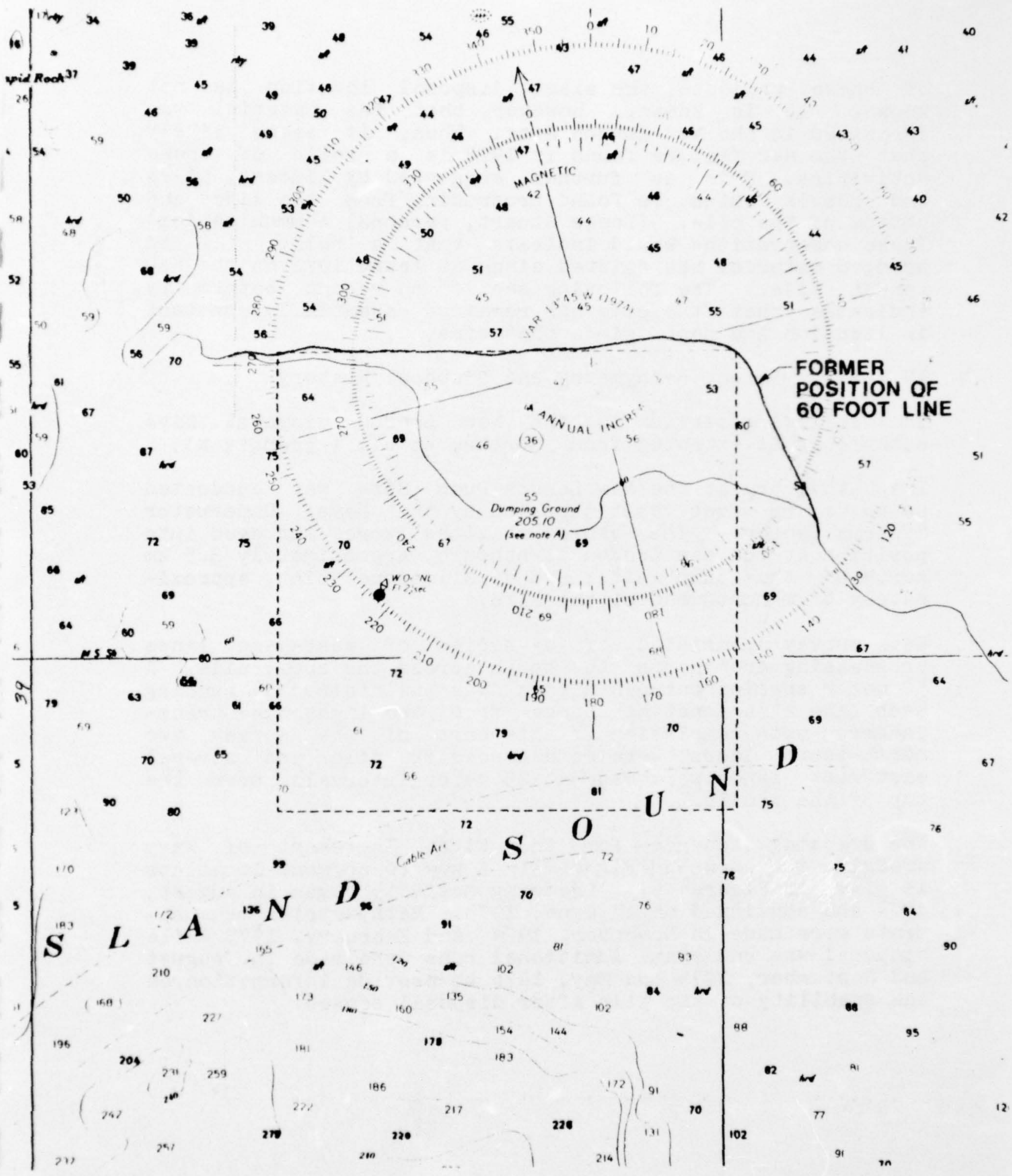
FIG.2

BATHYMETRY OF A BOTTOM DEPRESSION
SOUTHEAST OF FISHERS ISLAND N.Y.

CONTOUR INTERVAL (5 FT)
DATUM - MEAN LOW WATER

SCALE (YARDS)

PREPARED BY
R.W. MORTON AND G.S. COOK
NAVAL UNDERWATER SYSTEMS CENTER
NEWPORT R.I.



1975 NAVIGATION CHART OF NEW LONDON SITE

FIG. 3

of these projects, the exact disposal location is not known. It is known, however, that the material was deposited in the New London Site. Thus, it seems likely that the new feature found in 1972 is a relic of these activities. This is further suggested by timbers, piles and debris which are found protruding from the sides and bottom of the pile. (Lance Stuart, personal communication) These observations would indicate that a relic pile of dredged material has existed since at least 1972 on the New London Site. The following section on recent bathymetry indicates that the pile has remained essentially constant in location and depth since that time.

IV.A.2.b. Recent Bathymetry and Disposal History

The following section on the New London disposal site Bathymetry is exerpted from Morton, et al. (Appendix N).

The bathymetry at the New London Dump Site was conducted using a 65 foot boat supplied by the Naval Underwater Systems Center. The shore stations were surveyed into position at the New London lighthouse, approximately 3.5 km north of the dump site; and at Millstone Point, approximately 8 km northwest of the site.

Each survey consisted of a series of east-west lanes progressing from north to south across the spoil pile. A 50 meter spacing between lanes was maintained by running each lane at a constant range from the lighthouse transponder. Upon completion of this part of the survey two north-south lanes were made across the pile and several east-west lanes were made at 25 meter intervals over the top of the spoils.

The dredging sequence for the First Increment of Navy dredging is shown on Figure 4. A key to segment locations is given in Figure 5. Dredging activity began in August, 1974 and continued until June, 1975. Bathymetric measurements were made in November, 1974 and February, 1975 while disposal was underway. Additional runs were made in August and September, 1975 and May, 1976 to provide information on the stability of the pile after disposal ceased.

TABLE 2

DUMPING PERMITS - NEW LONDON DUMPING GROUND

1958 *THROUGH* 1971

EXTRACTED FROM THE RECORDS OF

THE SUPERVISOR OF NEW YORK HARBOR

ARMY CORPS OF ENGINEERS

NEW YORK DISTRICT

PERMITTEE	PERMIT NUMBER	DATE	ORIGIN OF MATERIAL	QUANTITY IN CUBIC YARDS
New England Dredge and Dock Company	1075	April 1-15, 1958	New London Harbor, New London, Connecticut	31,445
New England Dredge and Dock Company	1169	May 1-15, 1958	New London Harbor, New London, Connecticut	38,340
New England Dredge and Dock Company	1360	June 1-15, 1958	New London Harbor, New London, Connecticut	26,820
New England Dredge and Dock Company	1426	June 16-30, 1958	Pier 10, Sub-Base, New London	1,600
New England Dredge and Dock Company	1427	June 16-30, 1958	New London Harbor	32,800
New England Dredge and Dock Company	2	July 1-15, 1958	Pier 10, Sub-Base, New London	28,800
New England Dredge and Dock Company	1333	May 16-31, 1959	New London Harbor	12,390
New England Dredge and Dock Company	1511	June 16-30, 1959	New London Harbor	1,180
Webb and Knapp Marine Corporation	325	August 10-15, 1959	Sub-Base, New London	17,000
Webb and Knapp Marine Corporation	348	August 16-31, 1959	Sub-Base, New London	58,000
Webb and Knapp Marine Corporation	446	September 1-15, 1959	Sub-Base, New London	41,000
Webb and Knapp Marine Corporation	574	September 16-30, 1959	Sub-Base, New London	3,000
Webb and Knapp Marine Corporation	1000	December 1-15, 1959	Thames River, New London	33,000
New England Dredge and Dock Company	1361	February 16-29, 1960	New London Harbor	7,745
New England Dredge and Dock Company	1427	March 1-15, 1960	New London Harbor	6,550

PERMITTEE	PERMIT NUMBER	DATE	ORIGIN OF MATERIAL	QUANTITY IN CUBIC YARDS
New England Dredge and Dock Company	1482	March 16-31, 1960	New London Harbor	6,900
New England Dredge and Dock Company	1623	April 1-15, 1960	New London Harbor	19,740
New England Dredge and Dock Company	1757	April 16-30, 1960	New London Harbor	10,710
New England Dredge and Dock Company	1808	May 1-15, 1960	New London Harbor	3,585
New England Dredge and Dock Company	1953	May 16-31, 1960	New London Harbor	10,090
New England Dredge and Dock Company	2082	June 1-15, 1960	New London Harbor	4,115
McAllister Brothers, Incorporated	138	September 10-15, 1960	Connecticut State Pier, New London, U.S. Navy	2,500
McAllister Brothers, Incorporated	153	September 16-30, 1960	Connecticut State Pier, New London, U.S. Navy	95,000
McAllister Brothers, Incorporated	180	October 1-15, 1960	Connecticut State Pier, New London, U.S. Navy	19,500
Wilcox Towboat Company	212	October 1-15, 1960	Connecticut State Pier, New London, U.S. Navy	14,000
Webb and Knapp Marine Corporation	308	November 1-15, 1960	U.S. Naval Sub-Base, New London	30,000
Webb and Knapp Marine Corporation	342	November 16-30, 1960	U.S. Naval Sub-Base, New London	41,000
T. J. Smith	343	November 16-30, 1960	U.S. Naval Sub-Base, New London	442
T. J. Smith	382	December 1-15, 1960	U.S. Naval Sub-Base New London	442

PERMITTEE	PERMIT NUMBER	DATE	ORIGIN OF MATERIAL	QUANTITY IN CUBIC YARDS
Webb and Knapp Marine Corporation	383	December 1-15, 1960	U.S. Naval Sub-Base, New London	36,000
Webb and Knapp Marine Corporation	434	December 16-31, 1960	U.S. Naval Sub-Base, New London	4,000
Webb and Knapp Marine Corporation	435	December 16-31, 1960	U.S. Naval Sub-Base New London	4,000
Webb and Knapp Marine Corporation	436	December 16-31, 1960	U.S. Naval Sub-Base, New London	3,000
New England Dredge and Dock Company	593	February 21-28, 1961	Groton, Connecticut	700
New England Dredge and Dock Company	625	March 1-15, 1961	Groton, Connecticut	9,100
New England Dredge and Dock Company	644	March 16-31, 1961	Groton, Connecticut	17,850
Whaling City Dredge and Dock Company	859	May 23-31, 1961	New London Harbor	2,450
Webb and Knapp Marine Corporation	37	July 1-15, 1961	Thames River	9,360
Webb and Knapp Marine Corporation	98	July 19-31, 1961	Thames River, Naval Sub-Base	2,000
Webb and Knapp Marine Corporation	205	July 19-31, 1961	Thames River, Naval Sub-Base	2,000
Great Lakes Dredge and Dock Company	526	December 15-31, 1961	Groton, Connecticut	90,000
Great Lakes Dredge and Dock Company	561	December 15-31, 1961	Groton, Connecticut	18,090
Elizabeth Teti	585	January 9-15, 1962	New London, Connecticut	6,076
Elizabeth Teti	609	January 16-30, 1962	New London, Connecticut	18,228

PERMITTEE	PERMIT NUMBER	DATE	ORIGIN OF MATERIAL	QUANTITY IN CUBIC YARDS
Perini Corporation, Marine Division	157	September 7-30, 1962	Groton, Connecticut	7,280
Perini Corporation, Marine Division	214	October 1-31, 1962	Groton, Connecticut	5,600
New England Dredge and Dock Company	322	November 28-December 31, 1962	New London Harbor	27,082
New England Dredge and Dock Company	39-63	December 31, 1962-January 31, 1963	New London Harbor	40,306
New England Dredge and Dock Company	71-63	December 31, 1962-January 31, 1963	New London Harbor	24,622
Whaling City Dredge and Dock Company	95-63D	February 1-28, 1963	New London Harbor	900
New England Dredge and Dock Company	144-63D	March 1-31, 1963	New London Harbor	50,692
New England Dredge and Dock Company	208-63D	April 1-30, 1963	New London Harbor	8,760
New England Dredge and Dock Company	295-63D	May 3-31, 1963	New London Harbor	4,900
Whaling City Dredge and Dock Company	497-63D	August 1-31, 1963	Mountville, Connecticut	2,260
New England Dredge and Dock Company	522-63D	August 14-31, 1963	New London Harbor	12,260
Whaling City Dredge and Dock Company	825-63D	December 6-31, 1963	New London Harbor	10,200
Whaling City Dredge and Dock Company	36-64D	January 1-17, 1964	Groton, Connecticut	3,920
New England Dredge and Dock Company	779-64D	November 2-30, 1964	Groton, Connecticut	7,100
Webb and Knapp Marine Corporation	786-64D	November 5-30, 1964	Ft. Trumbell, Connecticut	35,750
Webb and Knapp Marine Corporation	25-65D	January 1-31, 1965	Ft. Trumbell, Connecticut	105,000

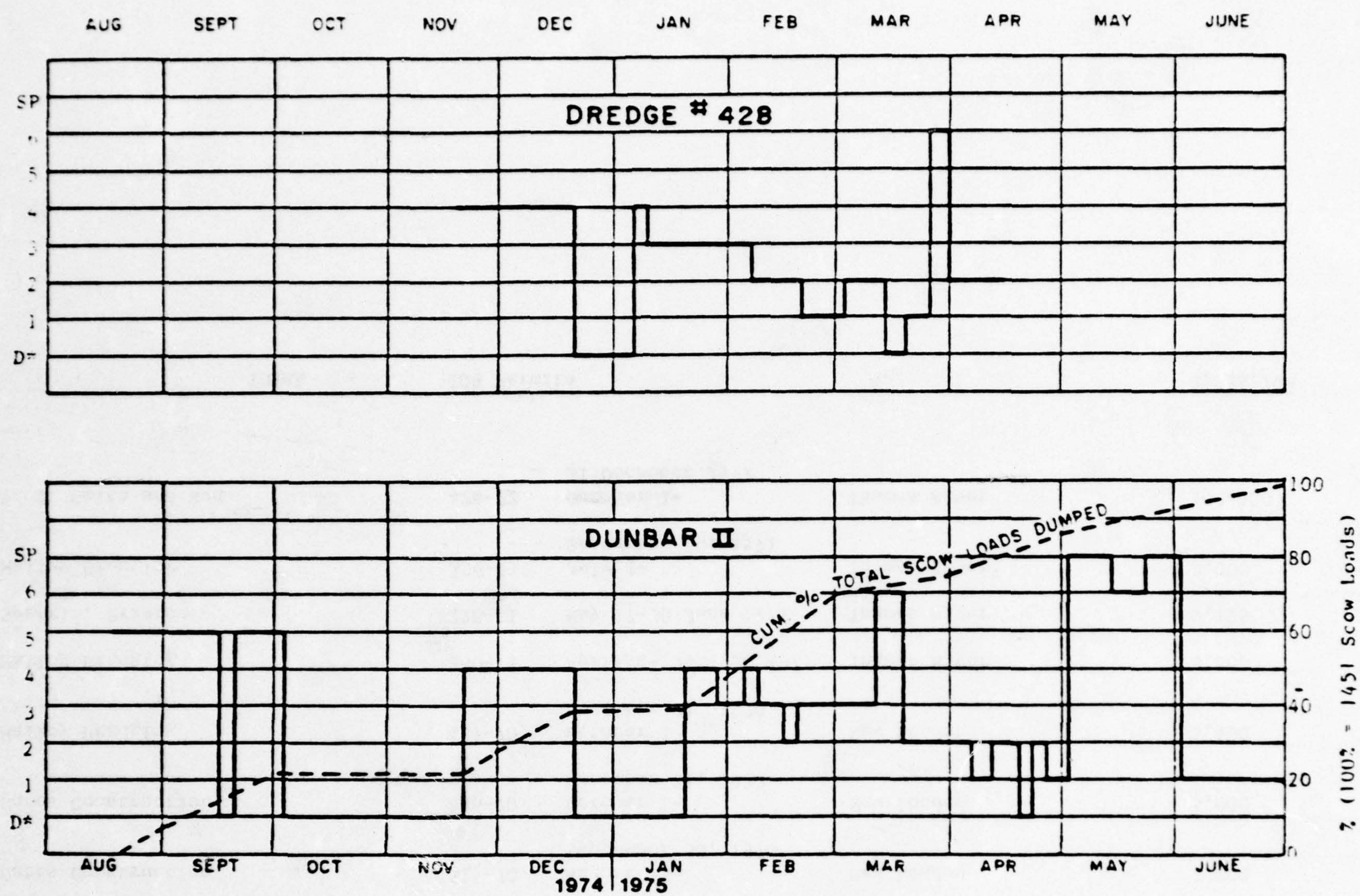
PERMITTEE	PERMIT NUMBER	DATE	ORIGIN OF MATERIAL	QUANTITY IN CUBIC YARDS
New England Dredge and Dock Company	65-65D	January 27-February 28, 1965	Groton, Connecticut	3,350
Webb and Knapp Marine Corporation	90-65D	February 1-28, 1965	Ft. Trumbell, Connecticut	82,000
Arundel Corporation	126-65D	February 15-28, 1965	New London, Connecticut	136,500
Webb and Knapp Marine Corporation	162-65D	March 1-31, 1965	New London, Connecticut	22,333
Arundel Corporation	180-65D	March 1-31, 1965	New London, Connecticut	222,000
Marine Contracting Corporation	198-65D	March 15-31, 1965	New London, Connecticut	8,600
Marine Contracting Corporation	262-65D	April 1-30, 1965	New London, Connecticut	16,100
Arundel Corporation	289-65D	May 1-31, 1965	New London, Connecticut	322,500
New England Dredge and Dock Company	405-65D	June 1-30, 1965	Groton, Connecticut	14,400
Webb and Knapp Marine Corporation	432-65D	June 14-30, 1965	New London, Connecticut	50,667
Webb and Knapp Marine Corporation	481-65	July 1-31, 1965	Trumbell Navy Yard, New London	1,000
New England Dredge and Dock Company	739-65	October 28-November 30, 1965	New London Harbor	7,810
Webb and Knapp Marine Corporation	116-66	February 2-28, 1966	Thames River, Connecticut	11,833
Arundel Corporation	118-66	February 4-28, 1966	Thames River at Dow Chemical	99,000
Arundel Corporation	119-66	February 4-28, 1966	Thames River, Smith Cove	87,375

PERMITTEE	PERMIT NUMBER	DATE	ORIGIN OF MATERIAL	QUANTITY IN CUBIC YARDS
Arundel Corporation	129-66	March 1-31, 1966	Thames River, New London	250,500
Arundel Corporation	130-66	March 1-31	Thames River at Dow Chemical	55,500
Arundel Corporation	234-66	April 1-30, 1966	Thames River, Smith Cove	130,500
Webb and Knapp Marine Corporation	538-66	28 July- 31 August 1966	Thames River, Groton, Connecticut	58,500
Webb and Knapp Marine Corporation	644-66	September 1-30, 1966	Thames River, Groton, Connecticut	3,000
Webb and Knapp Marine Corporation	650-66	September 1-30, 1966	Thames River, Groton, Connecticut	1,800
Webb and Knapp Marine Corporation	708-66	October 4-31, 1966	Thames River, Groton, Connecticut	36,000
Whaling City Dredge and Dock Company	97-66	May 10-31, 1967	Electric Boat Division-Offshore	8,225
Whaling City Dredge and Dock Company	105-67	20 March- 30 April 1967	Thames River, Groton	400
Webb and Knapp Marine Corporation	61-68	January 18- 31 March 1967	Thames River, Groton	2,000
Webb and Kanpp Marine Corporation	64-68	January 18- 31 March 1967	Thames River, Groton	9,700
Gates Construction and Island Marine	214	1 July- 30 September 1968	New London, Connecticut	140,000
Webb and Knapp Marine Corporation	281	22 August- 30 September 1968	Thames River, Groton	8,000

PERMITTEE	PERMIT NUMBER	DATE	ORIGIN OF MATERIAL	QUANTITY IN CUBIC YARDS
Great Lakes Dredge and Dock Company	373	December 11-31, 1968	Groton, Connecticut	22,000
Webb and Knapp Marine Croporation	51	January 1-31, 1969	Thames River	55,000
William A. Malloy	270	July 15- September 30, 1969	Groton, Connecticut	3,000
William A. Malloy	275	July 15- September 30, 1969	New London	3,000
Webb and Knapp Marine Corporation	295-69	September 15-30, 1969	New London	22,000
Webb and Knapp Marine Corporation	356-69	October 1- December 31, 1969	New London	13,000
Gates Brothers	379-69	November 12- December 31, 1969	Groton, Connecticut Navy Base	8,800
Gates Equipment	59-70	January 5- March 31, 1970	New London	22,000
William A. Malloy	63-70	January 1- March 31, 1970	Groton, Connecticut	5,000
Webb and Knapp Marine Corporation	89-70	March 9-31, 1970	Thames River	37,000
Webb and Knapp Marine Corporation	158-70	April 1-June 30, 1970	Thames River	39,000
William A. Malloy	166-70	April 1-June 30, 1970	New London	3,000
Malloy Dredging	732-70	July 1- 30 September 1970	Thames River	10,000
Island Marine Contractors	284-70	July 1- September 30, 1970	New London	20,000

47

PERMITTEE	PERMIT NUMBER	DATE	ORIGIN OF MATERIAL	QUANTITY IN CUBIC YARDS
Gates Construction	314-70	August 13- September 30, 1970	New London	7,000
Gates Construction	436-70	October 1- December 31, 1970	New London	5,000
Malloy Dredging	437-70	October 1- December 31, 1970	New London	5,400
Malloy Dredging	200-71	April 1- June 30 1971	Thames River	3,800
Speorin, Preston	228-71	May 17-30 June 1971	Thames River	9,125
Malloy Dredging	336-71	July 1- September 30, 1971	Thames River	3,000
T. J. Smith and Son	426-72	October 1- 31 December 1971	Thames River	103,400
TOTAL	109 Permits			3,356,298



SEQUENCE FOR FIRST INCREMENT OF THAMES RIVER DREDGING

FIG. 4

*Downtime

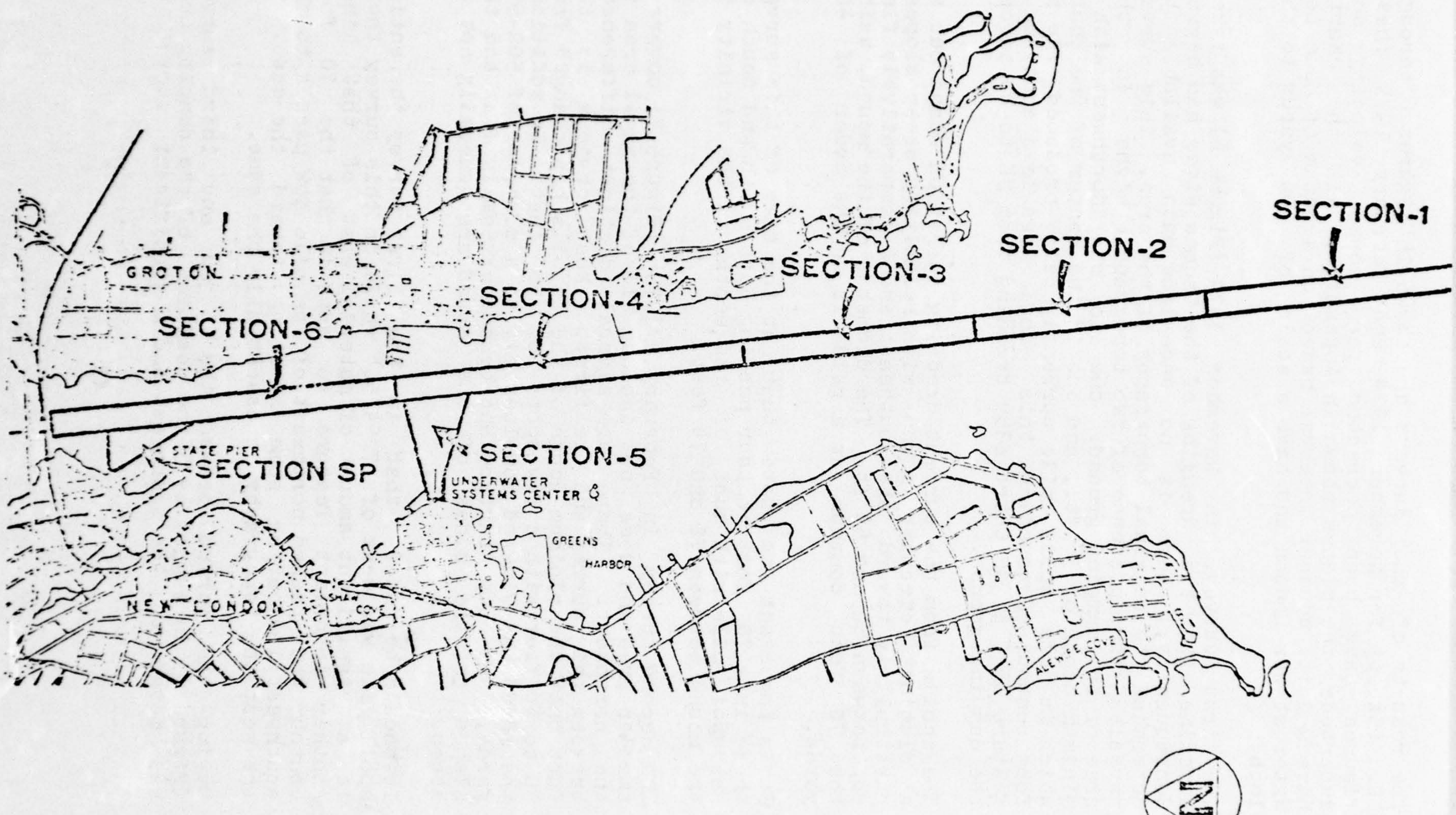


FIGURE 5 DREDGING SEGMENT LOCATIONS

The results of the surveys are shown in Figures 6 through 10. (Except for November 1974 and February 1975, these figures have been corrected for sound velocity and supersede the plates shown in Appendix.) All the charts have a 2 ft. contour interval based on a datum of Mean Low Water at New London and have a scale of 100 yards to the inch.

The first survey, in November 1974 (Figure 6) was taken sometime after the dredging of the Thames River had begun. Consequently, there is no base-line data available to determine the original topography of the area. This survey revealed the presence of two topographic highs in the area of the dumping ground: one to the northwest with a minimum depth of 36 ft., and one in the center of the chart which is the spoil pile currently being produced. The 60 foot contour surrounding this shoal area is a continuous feature on C & GS Chart #359 trending from SE to NW across the dumping ground.

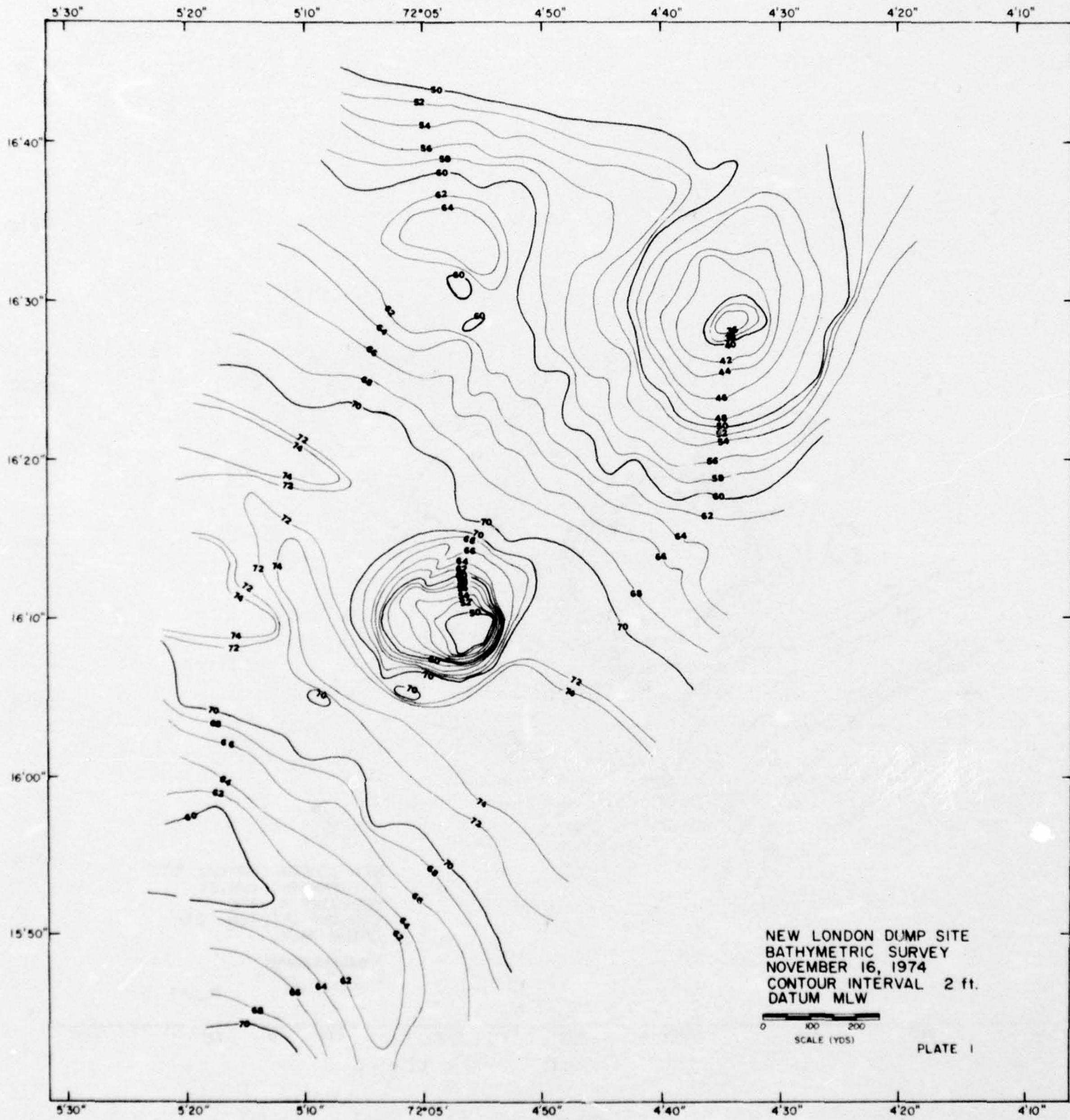
The spoils from the current dredging operation stand out as a distinct circular mound with relatively steep slopes, particularly toward the southeast and a comparatively flat top between 50 and 54 ft. The diameter of the mound, using the 70 foot contour as a guide is on the order of 400 yards.

It is important to note that at the time of this survey there is a 70 foot contour passing both north and south of the spoil pile with most of the depths in the vicinity of the mound between 72 and 74 feet.

The second survey in February, 1975 (Figure 7) covers a smaller area and does not include all of the shoal area to the northwest. There are several distinct differences between this survey and the first. Most obvious is the fact that the minimum depth of the spoils has changed from 50 to 58 feet with a few spots of 56 feet. In addition, the mound has widened considerably to a diameter of 500-550 yards, the top surface has become extremely flat and the slopes on the sides of the mound are generally not as steep.

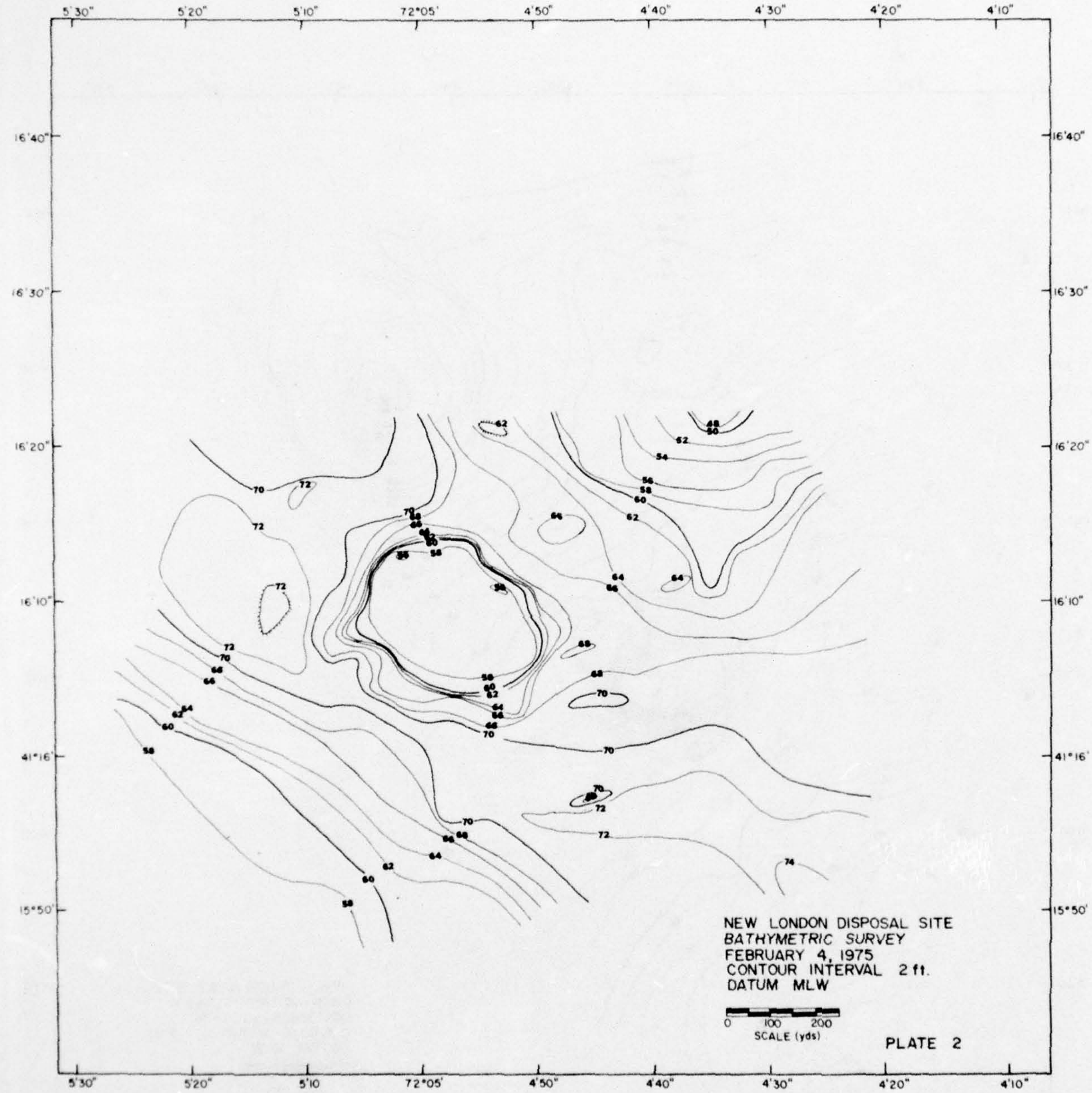
It should be noted that in the first survey the entire spoil pile was west of 72°4'50" while in this survey there is a significant amount of material east of that line. Another important feature to note is that the 70 foot contour that passed northeast of the pile now passes to the southwest indicating some shoaling toward the east. To the west the topography is essentially the same.

During the period between the second and third survey (Figure 8) in August 1975 the position of the dumping buoy was moved to the southeast and a significant amount of



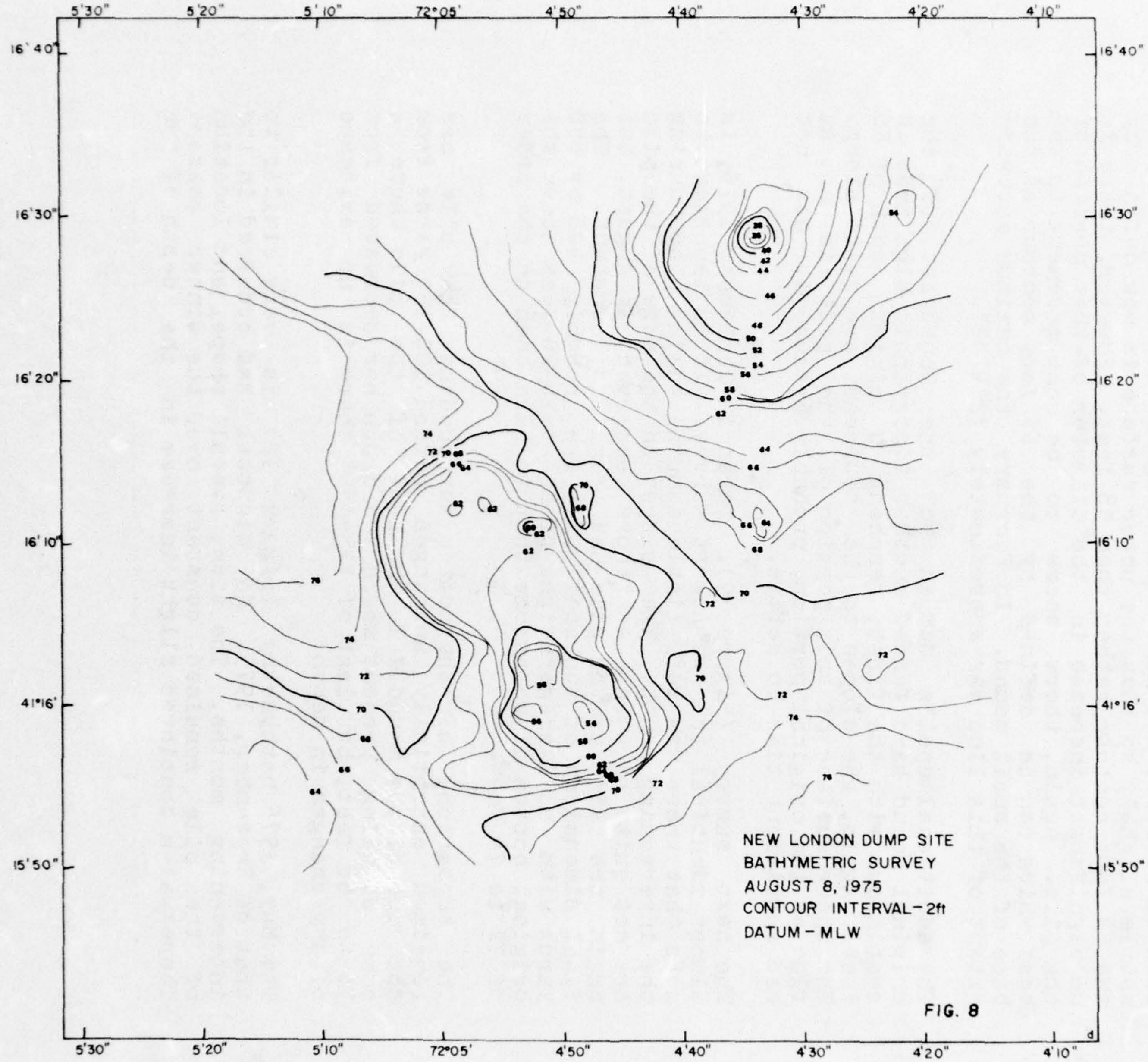
NEW LONDON DUMP SITE
BATHYMETRIC SURVEY
NOVEMBER 16, 1974
CONTOUR INTERVAL 2 ft.
DATUM MLW
SCALE (YDS)
PLATE I
5'30"
5'20"
5'10"
72°05'
4'50"
4'40"
4'30"
4'20"
4'10"
16'40"
16'30"
16'20"
16'10"
16'00"
15'50"

FIG. 6



NEW LONDON DISPOSAL SITE
BATHYMETRIC SURVEY
FEBRUARY 4, 1975
CONTOUR INTERVAL 2 ft.
DATUM MLW
SCALE (yds)
PLATE 2

FIG. 7



NEW LONDON DUMP SITE
BATHYMETRIC SURVEY
AUGUST 8, 1975
CONTOUR INTERVAL-2ft
DATUM-MLW

FIG. 8

dredge spoils was placed at the new location. This drastically altered the shape of the spoil pile giving it an elliptical shape trending from southeast to northwest.

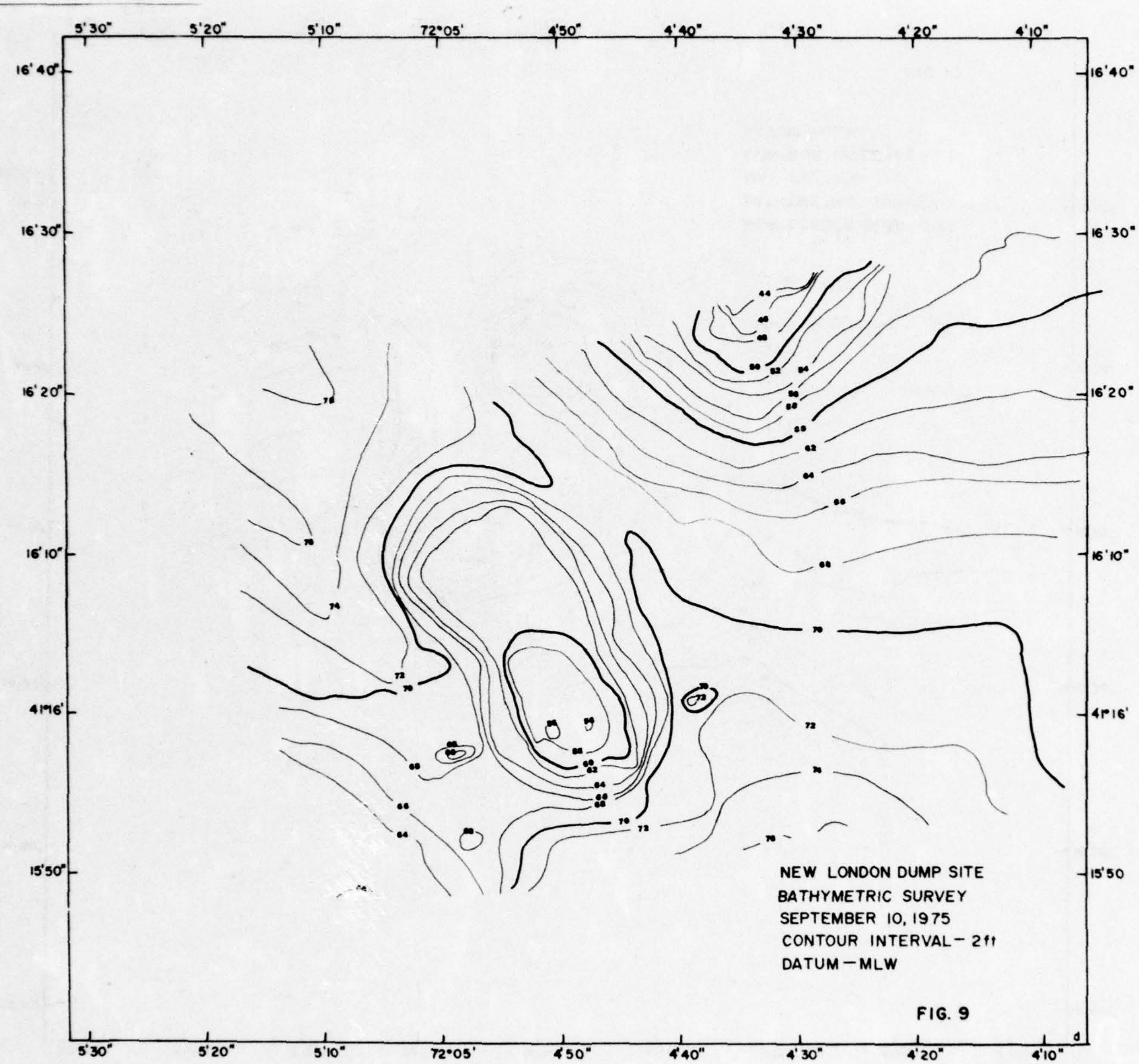
Between February and August the original mound continued to settle slightly so that the upper surface is now defined by the 64 foot contour rather than 58 feet. However, there is no significant increase in the diameter of that portion of the pile. Again, there seems to be some movement to the east which can be defined by the 66 foot contour at the base of the spoil mound. In February the maximum eastward extent of this line was approximately 72°4'42".

The additional spoils dumped to the Southeast of the original mound have formed another topographic high that is continuous with the first, reaching a minimum depth of 56 feet. Again, the slopes to the southeast are quite steep. The upper surface of this portion of the pile is not as flat as the original portion, probably because it has not had sufficient time to settle.

The next survey (Figure 9), taken in September 1975, is almost identical to the August survey. It is important to note that there was very little dumping taking place during the intervening month. The slopes on the edge of the pile are not quite as steep as those observed in August, but again the size of the pile has remained constant. The final dimensions of the spoil pile are roughly 400 by 800 yards with an average height of about 16-20 feet above the original bottom if we assume that to have been on the order of 72 to 74 feet.

The topography of the bottom surrounding the pile has remained essentially unchanged beyond 100-150 yards from the edge of the mound. To the East of the pile there is some shoaling present where the depth has decreased from 70 to 68 feet, but East of 72°4'40" there is no evidence of any changes in depth.

The May, 1976 bathymetry (Figure 10) is very similar to that of September, 1975. No disposal had occurred in the intervening months. The size, overall shape, and location of the pile remained constant over the winter season. There was a continued slight increase in the depth of the



5'30"
5'20"
5'10"
72°05'
4'50"
4'40"
4'30"
4'20"
4'10"
16'40"
16'30"
16'20"
16'10"
41°16'
15'50"
NEW LONDON DUMP SITE
BATHYMETRIC SURVEY
SEPTEMBER 10, 1975
CONTOUR INTERVAL – 2ft
DATUM – MLW

FIG. 9


5'30"
5'20"
5'10"
72°05'
4'50'
4'40"
4'30"
4'20"
4'10"
16'40"
16'30"
16'20"
16'10"
41°16'
15'50"
NEW LONDON DUMP SITE
BATHYMETRIC SURVEY
MAY 28, 1976
CONTOUR INTERVAL - 2 ft
DATUM - MLW

FIG. 10

upper surface of both the northern and southern portions of the pile. At the 2-foot contour, however, the upper sufaces of the northern and southern portions were still defined by the same contours as in September.

The topography of the area around the pile remained essentially unchanged. The shoaling observed to the east of the pile in September, 1975, showed no further increases.

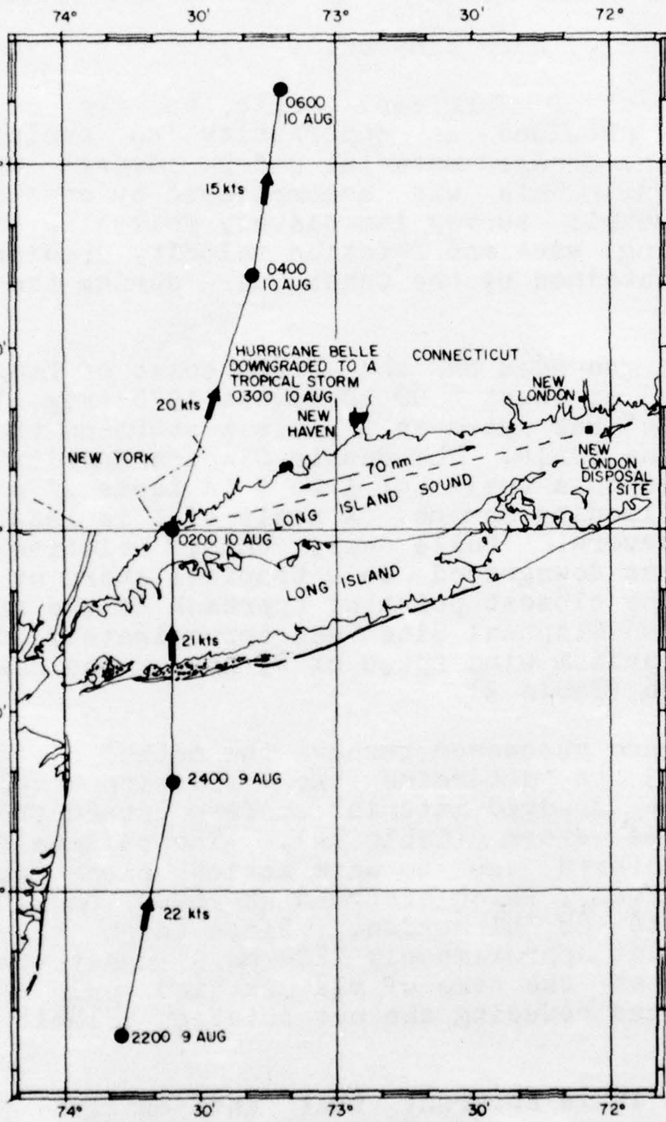
IV.A.2.c Effects of Hurricane Belle

The close approach of Hurricane Belle to the New London Disposal Site provided an opportunity to evaluate the stability of the dredged material under adverse wind and wave conditions. This was accomplished by conducting a detailed bathymetric survey immediately following the storm and by applying wave and friction velocity predictions to the wind data obtained by the Coast Guard during the period of the storm.

Hurricane Belle grounded on the south coast of Long Island (Rockaway Inlet) at about 0100 10 August 1976 (Fig. 11). At this time "Belle" was rated as a scale 1 storm on the Sassir Simpson Hurricane Scale. The Sassir Simpson Hurricane Scale rates hurricanes on a scale of 1 to 5 in terms of potential property and flooding damage. A scale of 1 is least severe and 5 most severe. Belle was, thus, a relatively mild hurricane and was downgraded to a tropical storm at 0300 10 August 1976. The closest point of approach of the hurricane to the New London Disposal Site was approximately 70 nm and resulted in a maximum wind speed of 45 kts at the New London Coast Guard Base (Table 3).

The wind data were processed through the method discussed in Section IV.C.3 to determine the friction velocities occurring on the dredged material surface (at 60 ft) during the period of the storm (Table 4). The maximum friction velocity encountered due to wave action alone was 1.43 cm/sec (0.05 ft/sec), which occurred at 0200 on 10 August moving in a NE to SW direction. Since high tide at New London occurred at approximately 2200 on 9 August, the tidal current vector at the time of maximum wind would have been to the east, thus reducing the net friction velocity on the bottom.

From these data it is apparent that the critical friction velocity of 4 cm/sec (0.13 ft/sec) required to erode material would not have been reached during this storm and



STORM TRACK OF HURRICANE BELLE

FIG.11

TABLE 3

WIND DATA AT NEW LONDON - HURRICANE BELLE

		Coast Guard New London		New London Ledge Light		Little Gull Island	
Date	Time (local)	Dir	Speed (kts)	Dir	Speed (kts)	Dir	Speed (kts)
9 Aug	1500			SE	8	SE	7
	1800			SSE	6	EVACUATED	
				EVACUATED			
	2100	NE	5				
	*2100+	NE	25				
	2200	N	25				
	2300	N	20				
10 Aug	0200	NE	45				
	0300	NE	20				
	0400	E	20				
	0500	E	20				
	0800	E	35				
	0900	S	28				
	1100	S	20				
11 Aug	0900	CALM					

* Two wind readings during same observation time because of increasing winds.

TABLE 4

FRICTION VELOCITY AT NEW LONDON - HURRICANE BELLE

Date	Time (local)	Dir	Speed kts	Speed (m/sec)	U_* (cm/sec)
9 Aug	2100	NE	5	(2.6)	-
	2100	NE	25	(12.9)	0.42
	2200	N	25	(12.9)	0.27
	2300	N	25	(10.3)	0.14
10 Aug	0200	NE	45	(23.2)	1.43
	0300	NE	20	(10.3)	0.23
	0400	E	20	(10.3)	-
	0500	E	20	(10.3)	-
	0800	E	35	(18.0)	0.13
	0900	S	28	(14.4)	1.01
	1100	S	20	(10.3)	0.56

Friction velocities (U_*) at the New London Disposal Site at 60 ft depths based on wind data from Coast Guard Base New London, CN. (see table 1). U_* determined from method by Massey (Ref.).

the material should have remained stable and in place. Thus a bathymetric survey of the spoils was made on 13 August in order to determine whether or not this was the case.

The bathymetry survey was conducted in the same manner as previous surveys with a 50 meter line spacing using the Decca-Del-Norte trisponder navigation system with the Edo Precision Fathometer and Digitrak units. Corrections were made for tidal height from data predicted for New London.

The resulting bathymetric smooth sheet indicated that the entire area of the survey was deeper than any previous charts had indicated. Prior to this time no corrections for sound velocity had been made since it was felt these would be negligible due to the shallow depths encountered. However, since the surveys were being conducted during various seasons where temperature differences could be large it was decided to correct all the data for sound velocity as computed from various data source. The velocities used for correcting the depths, the sources of the data and the correction formula are all presented in Table 5.

After correcting these surveys for sound velocity, a steady increase in the measured depth over the entire area of the site was found for each succeeding survey. In order to establish whether or not this was a real change, an extensive investigation into the calibration of the bathymetric system was initiated. As a result it was discovered that the precision fathometer and the Digitrak had been built with different timing crystals so that the recorder was calibrated for a sound velocity of 4920 feet per second while the Digitrak was calibrated for 4800 feet per second. This difference caused all the draft settings and sound velocity corrections to be in error, and a complete recalculation of true depth was required.

The August and September 1975 and the May 1976 charts reproduced here all have the final corrections applied as does the August 1976 chart shown in Figure 12. Vertical profiles were made along parallels 41°16'10" and 41°16'00" and across the long axis of the pile along a bearing of 150° true (Figure 13). These profiles indicate little change in the elevation of the spoil pile surface from August 1975 through May 1976; however, the August 1976 survey may still have some error as depths, both on and off the spoil pile, are slightly deeper than the other surveys.

Although there is a small error in the August 1976 survey, it is apparent from the continuity of features both in time and space that the precision within surveys is very good.

TABLE 5

SOUND VELOCITIES USED TO CORRECT BATHYMETRY DATA

Survey		Sound Velocity (ft/sec)	Source of Sound Velocity Data
16 Nov	1974	4843.9	Volume III - Supp to EIS 2nd Quarterly Report
4 Feb	1975	4787.2	Volume III - Supp to EIS 3rd Quarterly Report
8 Aug	1975	4967.2	NUSC STD data
9 Sept	1975	4967.2	NUSC STD data
27 May	1976	4652.0	Nalwalk et al 1974, final report on Oceanographic Studies, University of Connecticut - Groton, CT
13 Aug	1976	4965.9	Personal Communication Dr. Frank Bohlen - Univ of Connecticut

Formula used to apply sound velocity correction.

$$Z_{true} = Z_{measured} + \frac{Z_{measured}\ (V - 4800)}{4800}$$

where V is the true sound velocity

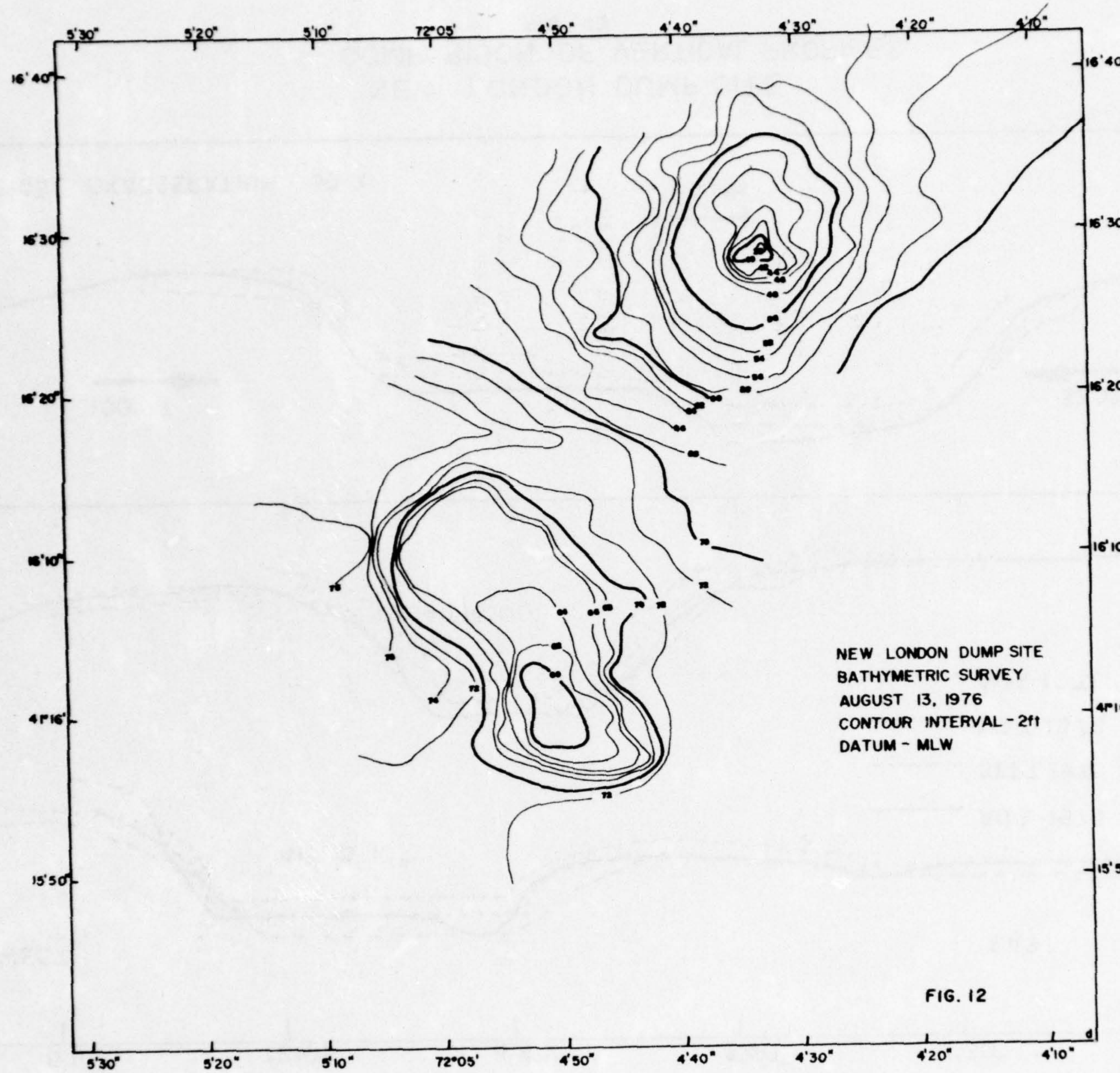
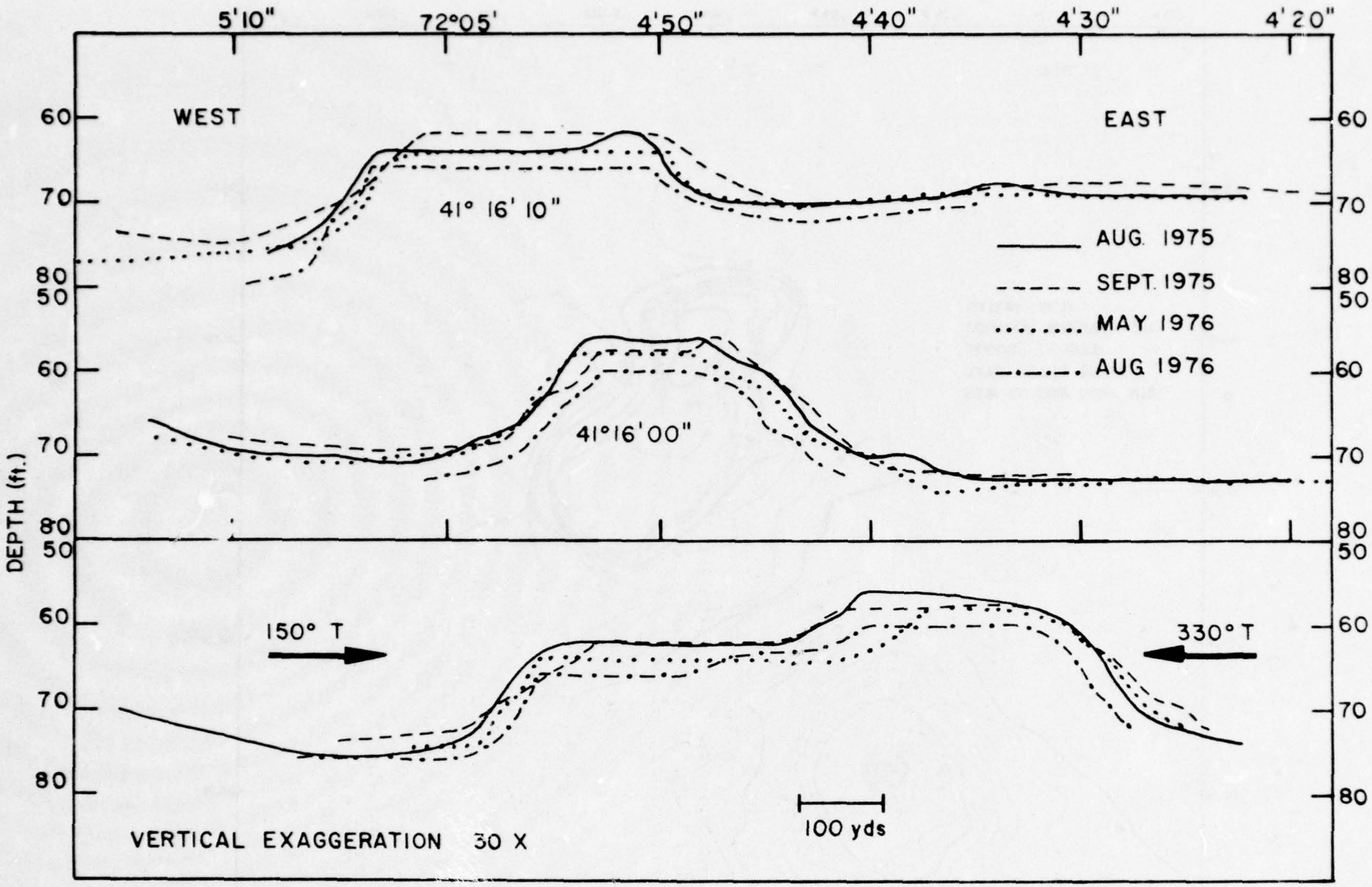

NEW LONDON DUMP SITE
BATHYMETRIC SURVEY
AUGUST 13, 1976
CONTOUR INTERVAL - 2ft
DATUM - MLW
5'30"
5'20"
5'10"
72°05'
4'50"
4'40"
4'30"
4'20"
4'10"
16'40"
16'30"
16'20"
16'10"
41°16'
15'50"

FIG. 12



NEW LONDON DUMP SITE
COMPARISON OF VERTICAL PROFILES
FIG. 13

Consequently, a rough estimate of the volume changes of the spoil pile can be made and these changes can be compared to evaluate the stability of the spoils.

An approximation of a partial volume of the spoils was determined by summing the area of each isobath and multiplying by the contour interval from the top of the pile down to the lowest isobath that closes on itself. This does not in any way measure the total volume of spoils present but gives an idea of volume changes in the area most susceptible to erosion, particularly by wave action.

The volume of dredged material from top to deepest isobath that closes on itself was:

August 1975	-	454,561 cu. yd.
September 1975	-	499,383 cu. yd.
May 1976	-	452,960 cu. yd.
August 1976	-	451,759 cu. yd.

(These values do not represent the total volume of material.)

The September 1975 bathymetry survey was run with a line spacing of 100 meters as opposed to a 50 meter line spacing for the other surveys. The resulting survey chart is therefore lacking in detail which probably reflects the erroneously high value for the computed volume.

The percent decrease in dredged material volume was:

August 1975 to May 1976	-0.353%
August 1975 to August 1976	-0.617%
May 1976 to August 1976	-0.266%

The maximum change from August 75 to August 76 of 0.6% or less than 3000 cubic yards is well below the error range that could be expected due to random system error and the subjective nature of contouring a bathymetric chart. Consequently, it may be concluded that neither the winter storm season (1975-1976) nor Hurricane Belle have produced measurable changes in the dredged material pile.

IV.B. SEDIMENTS

IV.B.1. East Hole Sediments

The sediments present at East Hole and the area immediately surrounding East Hole have been investigated on several occasions: Savard (ref. 187) reports four (4) sample stations in the area of East Hole; the U.S. Army Corps of Engineers, New England Division reports 21 sample stations; and the MACFC East Hole Final Report, (Appendix N) presents results from six (6) sample stations. All samples are summarized in Appendix N of the SEIS.

The sample station results presented encompass an area of approximately six (6) square nautical miles.

Sediment parameters from all of the above sources are summarized in the East Hole Final Report (Appendix N). Parameters considered include mean grain size, percentages of various grain size classes, sorting, and graphic kurtosis and skewness.

Skewness, kurtosis and sorting were calculated using techniques originally presented by Folk and Ward (1957). These statistical techniques were applied to all the data presented by the above authors. Original computations of sorting for the COE, NED data were based on the methods of Trask (1932).

Results based on the Folk method indicate that the sediments at East Hole are poorly sorted, whereas sorting indexes based on the Trask method indicate that the sediments have good to moderate sorting. Trask's method for computing sorting is generally not as accurate as is Folk's method as it utilizes the portions of the cumulative grain size curve between the 25th and 75th percentiles, while Folk's method considers the cumulative curve between the 5th and 95th percentiles.

In the case of most of the East Hole Sediment samples, they are moderately well sorted between the 25th and 75th percentiles, however when the additional portion of the curve between the 5th and 95th percentiles is considered, the sediments are considered to be poorly sorted.

At the time of the writing of the Draft SEIS, the sediment sorting analyses available were computed using Trask's method. Subsequent to that, in the East Hole Final Report (Appendix N), sediment sorting was recalculated using the method of Folk and it is this information which forms the

69

basis for drawing the conclusion that the East Hole sediments are poorly sorted.

A complete description of the results from sediment sampling at East Hole is presented in Appendix N of this document. Briefly, however, the sediment size distribution for the East Hole (Shown on Figure 14) may be characterized as follows:

1. Sediments on the shoulders north and south of the easternmost depression (between the 120 and 150 foot contours) average between 70-80 percent sand and 20-30 percent silt and clay.

2. The sediments in the eastern 2/3's of East Hole (150-170 feet) vary between 68 and 76 percent sand and 32 to 24 percent silt and clay.

3. Sediment samples from the western 1/3 of East Hole average 64% sand, 36% silt and clay. (based on 2 reported analyses)

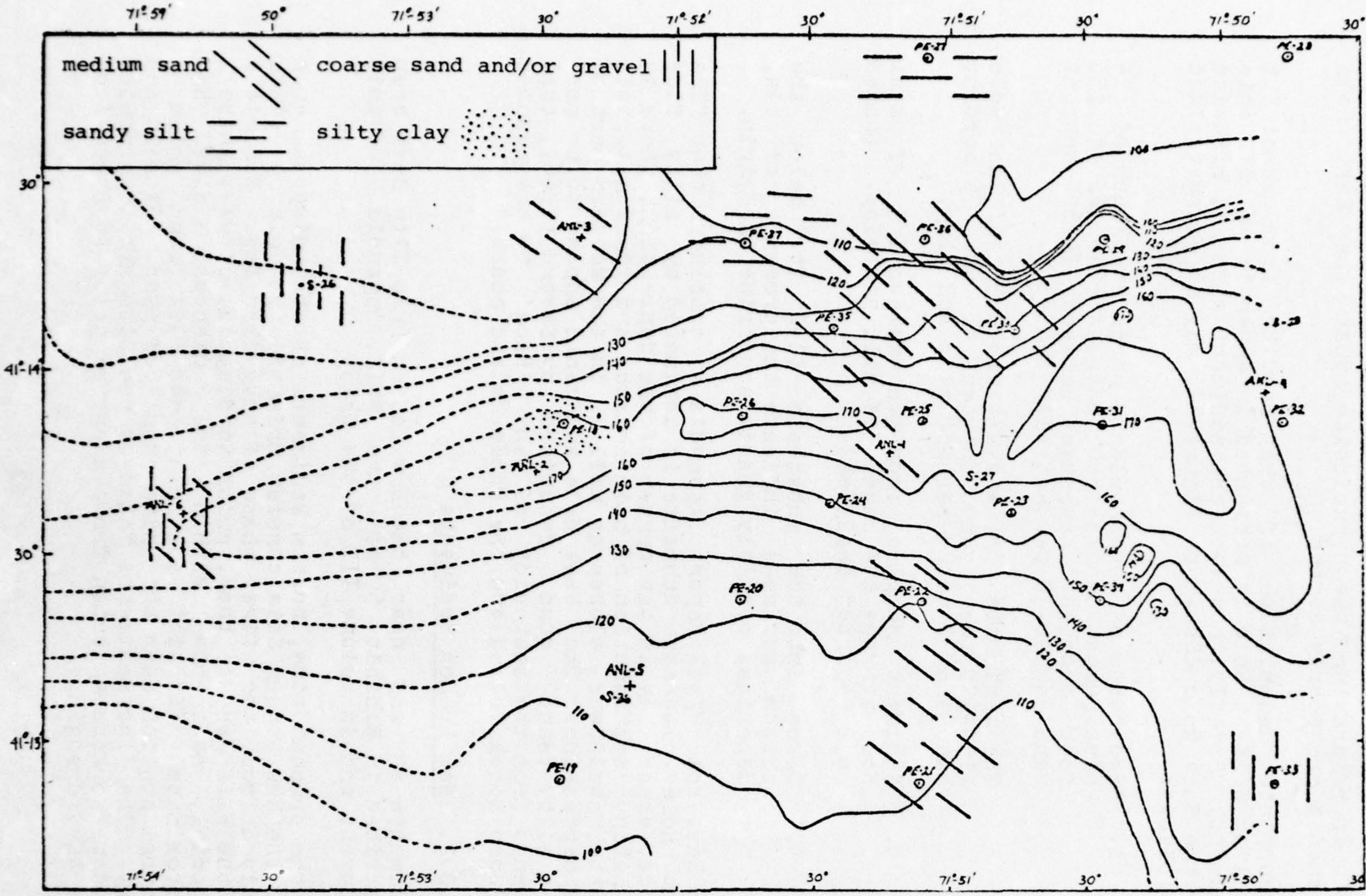
4. Cores into the substrate (1-2 ft. below the bottom surface) indicate the presence of clay deposits, possibly glaciolacustrine in origin.

The East Hole Final Report (Appendix N) concludes that "The East Hole alternate dumpsite is dominated by silty fine sands, especially in the center of the depression; there is a patchy distribution of both coarser and finer materials on the shallower slopes as well as in the western part of the depression. The East Hole sediments appear to be part of a silty [sand] zone, described by Savard (1966), that extends from the east side of the 'Race' to the channel between Block Island and the Rhode Island coast."

IV.B.2. <u>New London Sediments</u>

Sediments at and near the New London Dump Site have been described in Exhibit 5 of the FEIS, Appendix N of this document and in Volume III of the SEIS.

At the present time, bottom sediments at the disposal area in the New London Site consist primarily of clayey silts derived from the first phase of Navy dredging. Exhibit J of the FEIS shows that, prior to disposal of Navy Phase I material, sediments within the disposal site had approximately 60% silt and clay and 30% sand while a control station near the site had 60% sand, 30% silt and clay. The fine sediments found at the site are interpreted by some workers as being from disposal prior to Phase I of the Navy dredging.



EAST HOLE SEDIMENT SAMPLES FROM MACFC

FIG. 14

Detailed sediment sampling was carried out by MACFC for inclusion in its Quarterly reports, the results of which may be found in Volume III of the SEIS. A brief summary of sediment size and sorting of native sediments in the area within a 2 1/2 mile parimeter of the center of the disposal area, but not within the one mile square disposal area, is presented below in Table 6. Two sampling dates are represented here; November 1974 and April 1975. The variance in mean grain size from one data set to the next is probably due to the difficulties in relocating previous sample stations. Sample locations are shown on Figure 15.

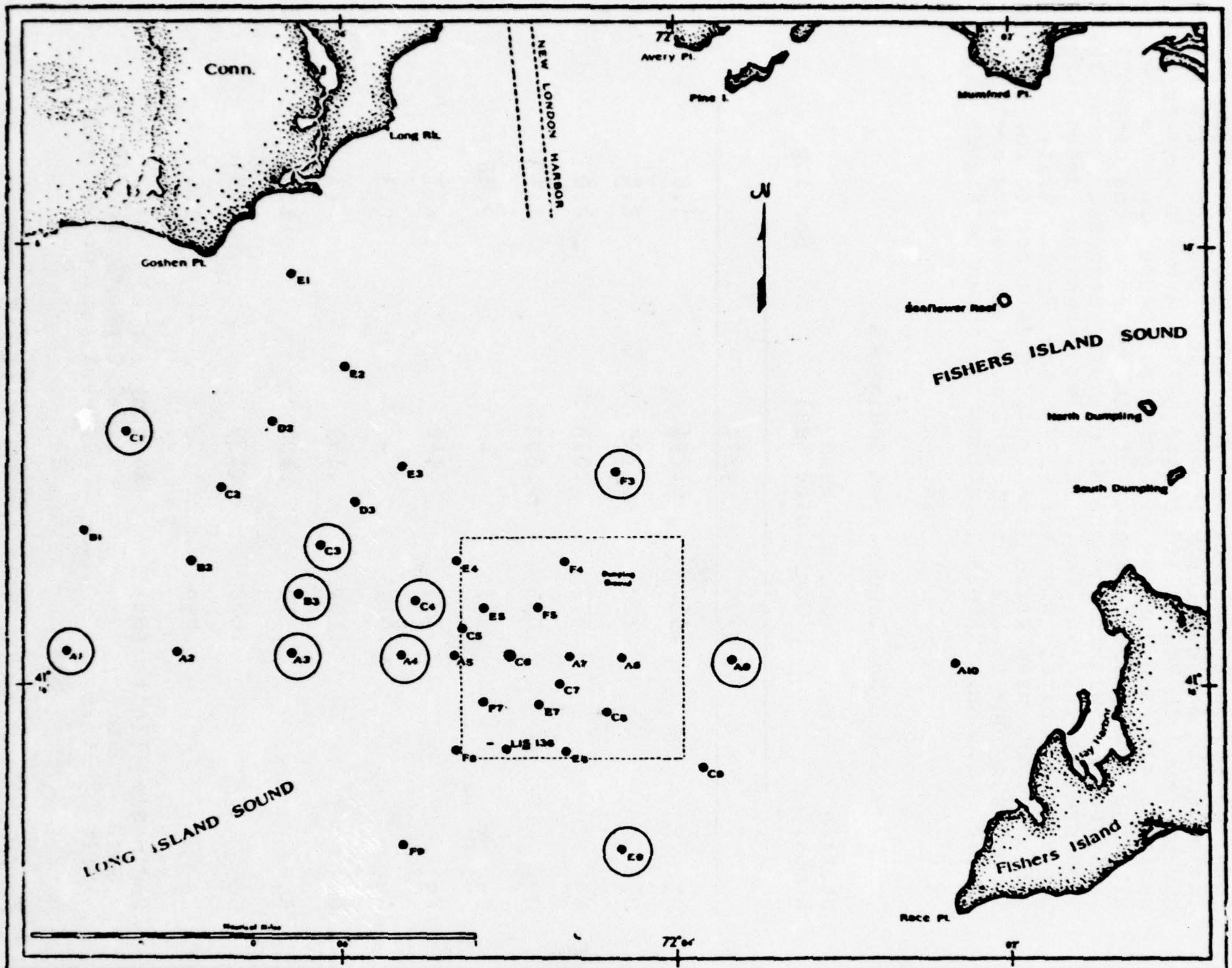
TABLE 6

New London Area Sediments

Station Number	Graphic Mean Grain Size (mm)		Sorting
	4/75	9/74	
A_1	.530	.296	1.67
C_1	.229	.349	2.8
A_3	.072	.093	2.0
B_3	.005	.093	1.57
C_3	.181	-	2.88
F_3	.197	.142	2.7
A_4	.011	-	2.3
C_4	.104	.145	2.3
A_9	.110	.100	1.8
C_9	.062	.139	1.9
E_9	.259	-	1.6

Grain Size Limits (mm)
Sand 2mm
Silt .0625mm

Sorting (Folk)
1.0-2.0 poorly sorted
2.0-4.0 very poorly sorted



NEW LONDON SEDIMENT SAMPLES

FIG. 15

The sediments away from the disposal site may be considered, generally, as being fine to very fine, poorly sorted sands.

IV.C. CURRENTS

Current measurements at East Hole and New London have been carried out by various workers and are reported in the following sections. Measurements which are discussed include bottom tidal velocities, wave-induced bottom velocity, and net drift. Definitions of these terms are included in the "Summary of Comments" (Section II of this volume). Current measurements by Morton, et al. are included in Appendix N to this document, while measurements by Hollman are included in the MACFC Quarterly Reports (1-4 in Vol. III, SEIS), and the Fifth and Sixth Quarterly Reports which have been distributed separately.

IV.C.1. East Hole Currents

Near-bottom tidal current velocity measurements at East Hole are reported by Morton, et al. (Appendix N of this document).

A summary of the current conditions near the bottom and of net drift in the area of the disposal site is presented below and in Table 7. The height above the bottom at which these measurements were taken appears at the end of this section.

The average tidal current velocity near the bottom in the East Hole averages about 8-9 cm/sec (0.26-0.30 ft/sec) uniformly toward the southwest and west-southwest. The average of the highest near-bottom ebb tidal velocities was about 29 cm/sec (0.95 ft/sec). The average of the highest near-bottom flood tidal velocities was 40 cm/sec (1.31 ft/sec). The standard deviation for both ebb and flood directions was from 3-5 cm/sec. (0.10-0.16 ft/sec). The largest tidal velocity measured 1.5 meters from the bottom at the East Hole Site was in excess of 56 cm/sec (1.84 ft/sec) on July 8, 1975.

Net drift near the bottom is towards the west and southwest. If dispersal were to take place at East Hole the end result of spoil dispersal would be the same as that for New London; the material would move to central Long Island Sound. Work by Dehlinger et al., (ref. 65), also indicates a net drift near the bottom towards the west and southwest.

IV.C.2. New London Currents

Tidal current velocity measurements at New London have been carried out by various researchers. Work by the New York

TABLE 7

SUMMARY OF EAST HOLE NEAR BOTTOM CURRENT METER MEASUREMENTS

Current Condition	Meter Ht. Off Bottom	Measured Vel. (cm/sec)	Erosion Vel.
Mean bottom vel.[2]	1.5 meters	8-9	74
Mean max. bottom vel. (ebb)[2]	1.5 "	28.6	74
Mean max. bottom vel. (flood)[2]	1.5 "	40.0	74
Maximum bottom vel.[2]	1.5 "	56.0	71

[1]Measured velocity at this height above the bottom necessary to produce a friction velocity of 3.96 cm/sec.

[2]Morton, Cook, and Massey (1975)

Ocean Science Laboratory (R. Hollman) is included in all MACFC Quarterly Reports (Physical Oceanography Section). Additional information from NUSC is appended to this document (Appendix N).

A summary of the current velocities near the bottom and of net drift in the area of the disposal site is presented below and in Table 8. The height above the bottom at which these measurements were taken appears at the end of this section.

The mean tidal current velocity near the bottom at the New London Site averages about 7-8 cm/sec (0.23-0.26 ft/sec) during both December and August. Mean current direction during December tends to be ESE and in August slightly north of east. Although the current direction difference between December and August is quite small, it is probably due to higher fresh water run-off in December than in August and to a seasonal change in surface wind stress.

The average of the highest near-bottom ebb tidal velocities at the New London Site was about 43 and 41 cm/sec (1.41 and 1.35 ft/sec) for December and August, respectively. The average of the highest near-bottom flood tidal current velocities was 33.3 cm/sec (1.09 ft/sec).

Maximum near-bottom ebb tidal current velocities of 59 cm/sec and 61.1 cm/sec have been recorded at the dump site by Morton et al. (Appendix N), and Hollman (ref. 232) respectively. These velocities were measured at approximately 1.5 meters off of the bottom by Morton et al. and 1.0 meters off the bottom by NYOSL (R. Hollman).

Table XII of Morton, et al. (Appendix N) contains a summary of their current meter records both at New London and at East Hole.

Net drift near the bottom at the Site is to the east and southeast, and it is apparent that water from the Site becomes entrained in the Race (Hollman, in ref. 232). Once in the Race this bottom water would then be transported back into Long Island Sound by the net drift.

IV.C.3. Wave-Induced Currents

Wave-induced bottom velocities were considered in general terms in the SEIS, paragraphs 6.95 to 6.99, for the SSMO areas covering all 15 of the alternative disposal sites.

TABLE 8

SUMMARY OF NEW LONDON DISPOSAL SITE,
NEAR BOTTOM CURRENT METER MEASUREMENTS

Current Condition	Meter Ht. Off Bottom	Measured Vel. (cm/sec)	Erosion Vel.[1]
Mean bottom Vel.[2]	1.5 meters	7-8	74
Mean max. bottom vel. (ebb)[2]	1.5 "	41-43	74
Mean max. bottom vel. (flood)[2]	1.5 "	33.4	74
Maximum bottom vel.[2]	1.5 "	59	74
Maximum bottom vel.[3]	1.0 "	61.1	74

[1]Measured velocity at this height above the bottom necessary to produce a friction velocity of 3.96 cm/sec.

[2]Morton, Cook, and Massey (1975)

[3]Hollman, R. Third Quarterly Report, MACFC, 1975

Because the comments received on the SEIS focussed on the New London Site and East Hole, considerably more detailed investigations into wave-induced bottom velocities were made by NUSC-Newport. These are presented below.

IV.C.3.a. Calculation of Friction Velocities

The procedure used to estimate the maximum friction velocities likely to be encountered at the Dump Site and East Hole consists of:

1. Forecasting of wave heights and periods as functions of wind speed for various directions and fetches. (Fetch is the distance over water that the wind blows before it reaches a site.)

2. Calculation of bottom horizontal orbital amplitudes and velocities for the preceding wave heights and periods using ideal wave theory.

3. Calculation of corresponding wave Reynolds numbers, relative roughnesses and wave friction factors.

4. Calculation of friction velocities.

5. Analysis of wind speed and direction data to determine probability density distributions and cumulative probability distributions for the various directions.

6. Combining the friction velocity results from 4. with the probability distribution in 5. to estimate friction velocity probabilities.

IV.C.3.b. Step 1

The wave forecasting graphs given by Kinsman (ref 304) are included (Fig. 16) and were used to estimate wave heights and periods. For computational purposes the analytical functions were approximated by:

$$(1) \qquad \frac{gH}{U^2} = \begin{cases} 2.6 \times 10^{-3}\left(\frac{gx}{U^2}\right)^{0.479}, & \frac{gx}{U^2} < 1.5 \times 10^4 \\ 2.6 \times 10^{-1}, & \frac{gx}{U^2} \geq 1.5 \times 10^4 \end{cases}$$

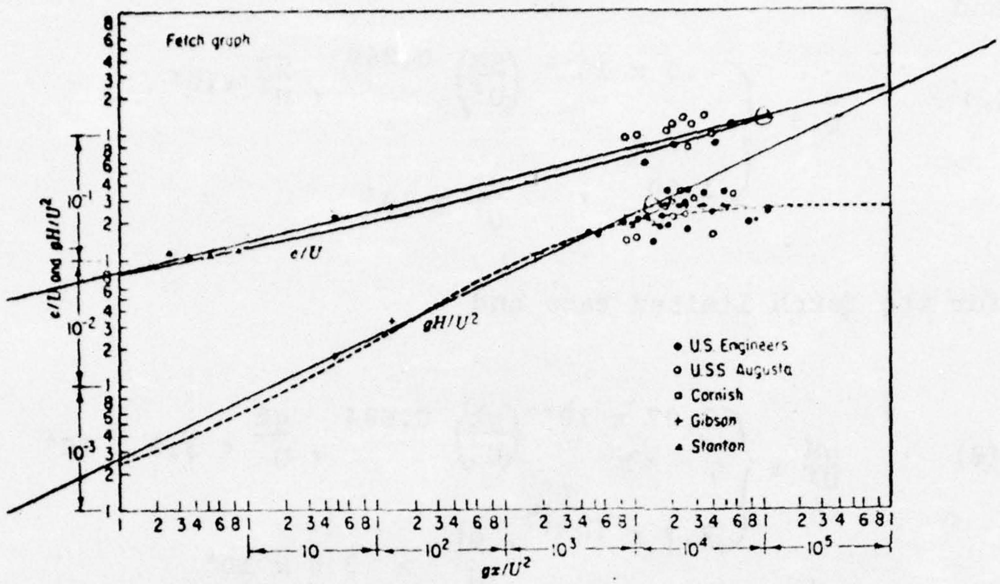


Fig. 6.4-3. Wave height and speed as functions of fetch. The theoretical functional dependence is shown by the curves, the supporting data by the plotted points. [From Sverdrup and Munk (1947)]

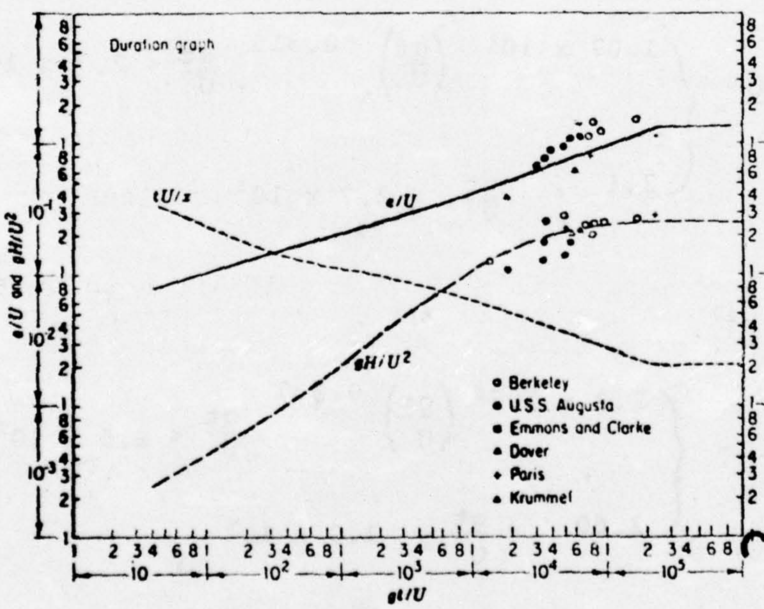


Fig. 6.4-4. Wave height and speed as functions of duration. The theoretical functional dependence is shown by the curves, the supporting data by the plotted points. [From Sverdrup and Munk (1947)]

FETCH AND DEPTH LIMITATIONS FOR WAVE GENERATION

FIG. 16

and

(2) $$\frac{c}{U} = \begin{cases} 8.0 \times 10^{-2} \left(\frac{gx}{U^2}\right)^{0.260}, & \frac{gx}{U^2} < 10^5 \\ 1.60, & \frac{gx}{U^2} \geq 10^5 \end{cases}$$

for the fetch limited case and

(3) $$\frac{gH}{U^2} = \begin{cases} 2.07 \times 10^{-4} \left(\frac{gt}{U}\right)^{0.684}, & \frac{gt}{U} < 3.6 \times 10^4 \\ 2.7 \times 10^{-1}, & \frac{gt}{U} \geq 3.6 \times 10^4 \end{cases}$$

(4) $$\frac{tU}{x} = \begin{cases} 1.07 \times 10^{2} \left(\frac{gt}{U}\right)^{-0.315}, & \frac{gt}{U} < 2.7 \times 10^5 \\ 2.1, & \frac{gt}{U} \geq 2.7 \times 10^5 \end{cases}$$

and

(5) $$\frac{c}{U} = \begin{cases} 2.3 \times 10^{-2} \left(\frac{gt}{U}\right)^{0.337}, & \frac{gt}{U} < 2.9 \times 10^5 \\ 1.60, & \frac{gt}{U} \geq 2.9 \times 10^5 \end{cases}$$

for the duration limited case. In eq's (1) through (5) x is the fetch (meters) U is the wind speed (m/sec), t is the duration (sec), g is the gravitational acceleration, 9.8 m/sec and H is the wave height (trough to crest) (meters). The procedure for wave forecasting is as follows. The quantity, gx/U^2, is calculated from the fetch, x, and wind

80

speed, U, and from eq. (1) the quantity c/U is found. Using this value the quantity, gt/U, is calculated using eq. (5), i.e.,

(6) $$\frac{gt}{U} = \left(43.5 \frac{c}{U}\right)^{2.97}$$

In eq. (6) t=tmin is the minimum time the wind speed must be maintained for the waves to be fetch limited, i.e., if the wind duration is greater than tmin the waves are fetch limited whereas if the duration is less than tmin the waves are duration limited. Without a sophisticated analysis of the available wind speed and direction data along with an extension of the wind wave generation theory it was not possible to include actual wind duration times in the computations. Therefore it was assumed that the duration was not more than 6 hrs. for all wind speeds, a not unreasonable value especially for severe storms. Thus for tmin <6 hrs equations (2), (4) and (5) are used to calculate wave heights and for tmin >6 hrs eq's (1) and (2) are used.

IV.C.3.c Step 2

From the forecast wave period, T, and water depth, D, the wave number, k, was found using:

(7) $$w^2 = gk \tanh (kD)$$

where the wave frequency

$$w = \frac{2\pi}{T}$$

and g is the gravitational acceleration. The horizontal orbital (particle) displacement and velocity at the bottom were calculated using

(8) $$A_b = \frac{H/2}{\sinh (kD)}$$

and

(9) $$U_b = w A_b$$

IV.C.3.d Step 3

The wave Reynolds number is given by

$$(10) \qquad Re = \frac{U_b A_b}{v} = \frac{U_b^2}{wv}$$

and the relative roughness by A_b/d_s , where the roughness element d_s is equal to the sediment grain diameter for a flat bottom; d_s was taken to be 1 mm. The wave friction factor, f_w, is found from Jonsson's Wave Friction Factor Diagram, Fig. 17 (ref. 305). For laminar flow where:

$$(11) \qquad Re < 1.26 \times 10^4$$

and/or

$$(12) \qquad \frac{A_b}{d_s} > \frac{4\sqrt{2}}{\pi} \sqrt{Re}$$

the wave friction factor is independent of the relative roughness and is given by

$$(13) \qquad f_w = \frac{2}{\sqrt{Re}}$$

For turbulent flow

$$\left(Re \geq 1.26 \times 10^4 \text{ and } \frac{A_b}{d_s} \leq \frac{4\sqrt{2}}{\pi} \sqrt{Re}\right) f_w$$

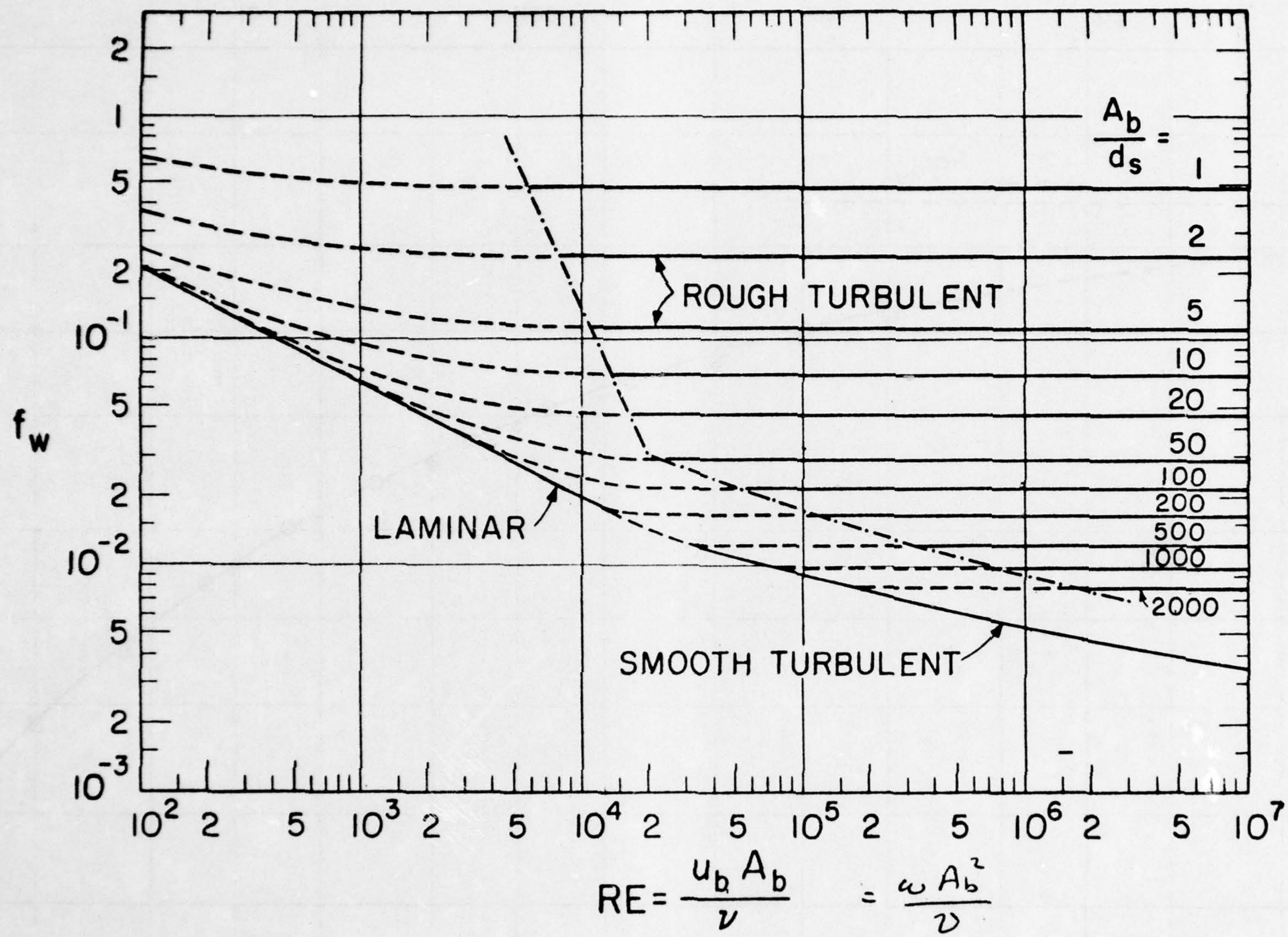
is approximately a function only of the relative roughness, as indicated in Fig. 17. The limitating values for large Reynolds number,

$$f_w = f_w \left(\frac{A_b}{d_s}\right)$$

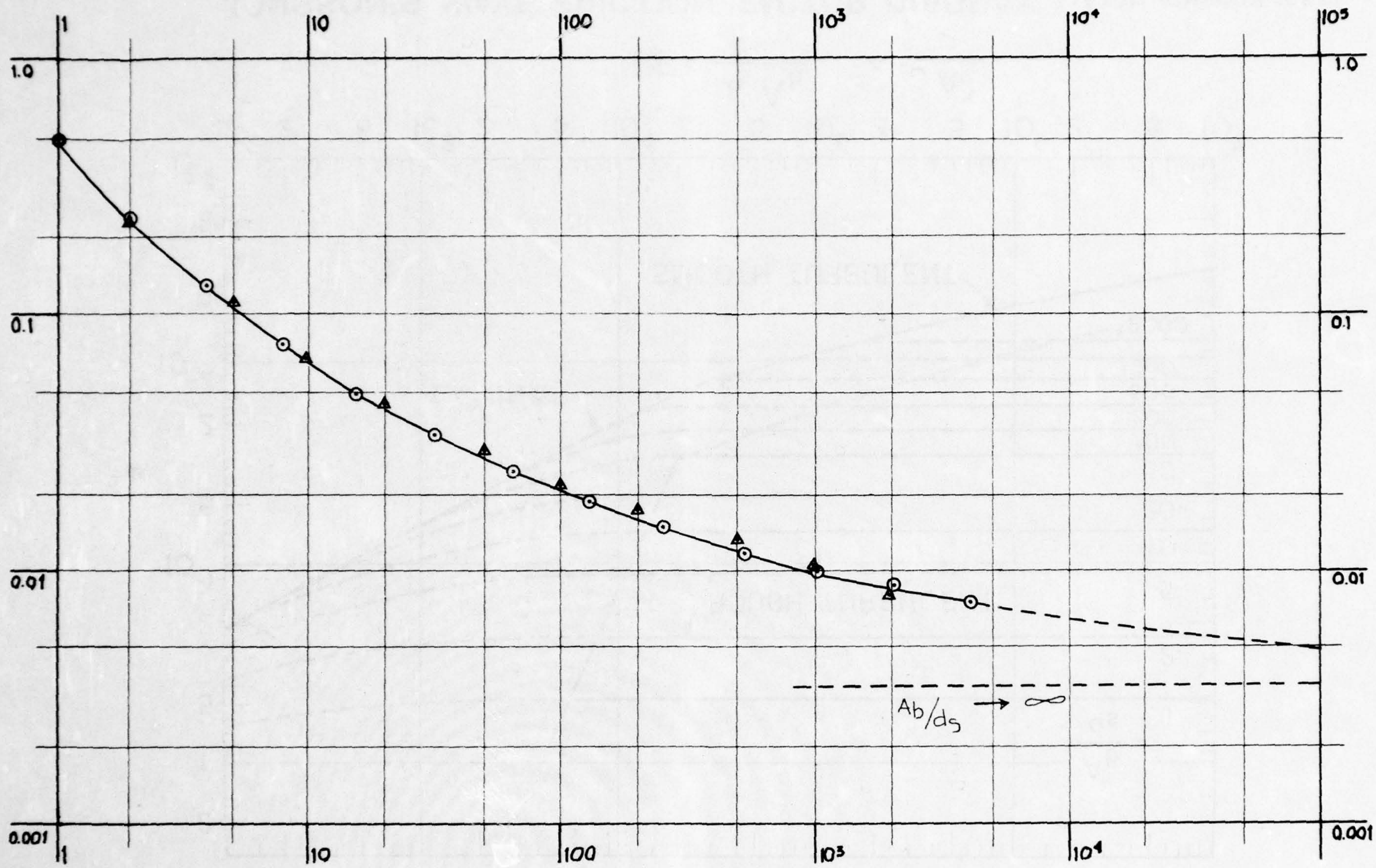
from Jonsson's wave Friction Factor Diagram are shown plotted in Figure 18 along with the analytic function

$$(14) \qquad \log (285.8\, f_w) = 2.137 \left(\frac{A_b}{d_s}\right)^{-0.224}$$

which is used to approximate f_w . From eq. (14)



JONSSON'S WAVE FRICTION FACTOR DIAGRAM (AFTER JONSSON, 1966)



RELATIVE ROUGHNESS vs WAVE FRICTION FACTOR

⊙ $\mathrm{LOG}\,(285.8\, f_w) = 2.137\,(A_b/d_s)^{-0.224}$
▲ JONSSON (MADSEN, PG. 17)

FIG. 18

(15) $$f_w = 3.5 \times 10^{-3} \ 10.0^{\left[2.137 \left(\frac{A_b}{ds}\right)^{-0.224}\right]}$$

IV.3.C.e Step 4

The friction velocity, U_* , is found using

(16) $$U_* = U_b \sqrt{\frac{f_w}{2}}$$

IV.C.3.f. Step 5

The wind speed and direction data obtained at the New London Ledge Light represented 5 years of observations taken at 3 hr. intervals for a total of 14, 315 points. The data was divided into 4 seasons: Jan-Mar; Apr-June, July-Sept and Oct-Dec and the probability density distribution and cumulative probability distribution found for each. The number of observations for the 4 seasons were 3591, 3384, 3669 and 3664. A total of 3800 points were recorded as "calm", with the 4 season breakdown being 551, 1165, 1367 and 717.

The direction range 0°-360° was divided into eight 45° increments and the speed range 0-30 m/sec was divided into sixty 0.5 m/sec increments.

The speed intervals were thus 0.001 - 0.499, 0.500 to 0.999, ..., 29.500 - 29.999 and the direction intervals -22.500 to +22.499, 22.500 to 67.499,..., 315.0 to 337.499. The probability density distribution was found by (1) counting the number of observations which fell within each interval of speed and direction and (2) dividing the counts by the total number of observations for the season so that the values within the matrix represent the frequency of occurrance and sum to 1.0. Calms were not included in the count but were included in the total number of observations for the season. Wind speeds ≥30 m/sec were included in the last speed interval, 29.500-29,999 m/sec. The cumulative probability distribution was found for each direction interval by successively summing the probability density distribution values over the wind speed intervals starting with the last value and progressing down:

(17) $$P_{ik} = \sum_{j=i}^{60} P_{jk},$$

where P_{jk} is the probability density for the jth wind speed interval and kth direction interval and P_{ik} is the cumulative probability for the ith wind speed interval and kth direction interval. P_{ik} thus gives the relative number of observations (or probability) for wind speeds greater than (and including) 0.5 (i-1) m/sec for directions between 45.0 (k-1) -22.5 and 45.0 (k) -22.5 (including the lower limit but excluding the upper limit).

IV.C.3.g Step 6

The wind-induced friction velocities as a function of direction were calculated for East Hole and the New Sondon Site. These were then added vectorially to the expected tidal friction velocities to determine those conditions under which the critical friction velocity of Thames River sediments (about 4 cm/sec) would be exceeded.

Since, at both sites, the tidal friction velocity is no greater than 2cm/sec (0.07 ft/sec) and the tidal flow is generally in the east - west direction, wave-induced friction velocities of 2 cm/sec (0.07 ft/sec) from easterly or westerly winds might cause erosive conditions. For north or south winds, perpendicular to the tidal direction, wind-induced friction velocity would have to be 4 cm/sec (0.13 ft/sec) to induce erosion. For the four intermediate directions, a wave-induced friction velocity of 2.33 cm/sec (0.08 ft/sec) would add vectorially to the maximum tidal friction velocity of 2 cm/sec (0.07 ft/sec) to yield a resultant of 4 cm/sec. (0.13 ft/sec). These then are the wave-induced friction velocities of interest.

These conditions were mapped onto the friction velocity versus wind speed and direction results obtained in Step 4 above. It was discovered that four conditions could yield erosive friction velocities at New London and one condition could do so at East Hole. These were:

	Direction	Velocity
For New London -	NE	28.5 meters/sec (93.5 ft/sec)
	SE	22.5 meters/sec (73.8 ft/sec)
	S	27.5 meters/sec (90.2 ft/sec)
	W	15.0 meters/sec (49.2 ft/sec)
For East Hole -	SE	26.0 meters/sec (85.3 ft/sec)

The cumulative probability distributions of wind speed versus direction, developed in Step 5 above, were then consulted to discover the probability of observing conditions which could yield erosive velocities at the two sites. The annual probability of reaching erosive velocities at New London was 0.65%. No observations in the weather record would yield erosive velocities at East Hole.

In meaningful terms, there is little chance that wave-induced friction velocities, combined with tidal friction velocities, will exceed erosive friction velocities at either site with any regularity; it is, however, slightly more likely at New London.

IV.D. BIOLOGY

IV.D.1. East Hole Biology

IV.D.1.a. Site Biology

The Middle Atlantic Coastal Fisheries Center has sampled the East Hole site and found a relatively low average species diversity of 1.80 (See Table 9). The average diversity indices ranged from 1.18 to 2.58. While there was wide range in the cumulative number of species per station (range 47-105 species) the average number of species per grab were higher than values found in the New London area and Long Island Sound. The dominant organisms during the sampling period were Ampelisca agassizi and Nucula proxima. The strong numerical dominance of these species in turn could be attributable to some aspect of the chemical and physical regimes of East Hole and more than likely the physical regime. As a result of food web studies on fish captured in East Hole, the amphipods were found to be the most important food item, dominating 88% of total numbers of food organisms and 52% of the total food volume. This is but a brief summary of a study conducted by MACFC on East Hole. For more detailed information the reader is referred to Appendix N of Vol. II of this SEIS.

IV.D.1.b. Area Biology - East Hole

Ampelisca agassizi has also been found to be the dominant organism in other areas of Block Island Sound as well. Franz (ref. 74) found a rich benthic community consisting of 85 species at two sample stations west of Block Island. Both locations were dominated by Ampelisca agassizi. Two of the MACFC sample stations used in the East Hole survey were not in the Hole itself but rather on the flanks; the same general findings resulted. Abbott (ref. 1) described the bryozoan communities in areas of Block Island Sound. Smith (ref. 303) reported on the benthic macrofauna in Block Island Sound. Although Smith quantified his data in terms of biomass, similar distributions and abundance of species was found then as now for both MACFC's and Franz's data.

There are two notable qualities about the benthos in this area. First, Block Island Sound contains an extensive and commercially valuable shellfishery for ocean quahaug. The quahaug meats are marketed and the majority go into clam chowders purchased in supermarkets. The second quality is the valuable finfishery which is supported by the high abundance of amphipods. These fisheries are discussed further below.

TABLE 9

A Summary of Average Diversity Values From New London and East Hole

	Summer 72	Fall 72	Winter 72-73	Summer 74	Fall 74	Winter 74-75	Spring 75	Summer 75	Fall 75
New London									
inside dump area	2.25[1]			2.48[3]	3.0[3]	1.22[3]	1.075[3]	1.88[3]	1.917[3]
.5 miles				2.41[3]	2.7[3]	2.65[3]	2.14[3]	2.06[3]	2.720[3]
1.0				2.863[3]	2.4[3]	2.3[3]	2.223[3]	2.98[3]	2.776[3]
1.5					2.7[3]				
2.0				1.804[3]	1.6[3]	1.53[3]	1.485[3]	2.12[3]	2.418[3]
A9				2.19[3]	1.6[3]	1.7[3]	1.66[3]	2.18[3]	1.527[3]
A10						1.1[3]			
F9				2.85[3]		1.7[3]			
2.4		1.621[2]	0.874[2]						
3.0	0.875[2]	1.427[2]	0.942[2]						
4.0	1.14[1]								
East Hole									
*1							1.69[4]	1.90[4]	1.47[4]
*2							1.60[4]	1.76[4]	
3							2.09[4]	2.27[4]	2.58[4]
4							1.56[4]	2.01[4]	
5							1.18[4]	1.52[4]	
*6							1.45[4]	1.46[4]	2.53[4]

*these stations were inside the hole and the others are on the shelf outside of the hole.

[1]Stations 135, 136 from Environmental Baselines in Long Island Sound, 1972-1973 Final Report Informal Report No. 42

[2]Stations 7 (3 miles), 8 (2.4 miles) of Benthic Amphipoda of Fishers Island Sound Connecticut C. Biernbaum 1975

[3]Stations of MACFC Reports

[4]Hydrology, Sediments, Benthic Macrofauna and Demersal Finfish of an Alternate Disposal Site (East Hole in Block Island Sound for the Thames River (Conn) Dredging Project) Informal Report No.110 June 1976

IV.D.1.c. Site Fishery - East Hole

Fish sampling by MACFC at East Hole resulted in the capture of 22 species of finfish. In addition, lobster and squid were found in trawls. Many of these fish were found to have seasonal distributions. During winter sampling the six most numerically common fish were: little skate, red hake, windowpane, winter flounder, longhorn sculpin, and ocean pout. In the summer the six most numerically common fish were butterfish, red hake, little skate, winter flounder, silver hake, and windowpane.

The Draft SEIS indicated that a limited amount of finfish trawling takes place at and around the East Hole site. This comment was predicated on reports from Stonington fishermen and other boat captains who in effect indicated that; "yes, we fish the area" but were reluctant to disclose the extent and yield of their favored areas. As also indicated in the Draft SEIS, the National Marine Fisheries Service reported a low yield for the 10 minute grid 411N, 715W. However, this NMFS data is very much non-specific for either East Hole or its surrounding area. In view of comments made at the Public Hearings which report little to no commercial fishing at East Hole, and little contribution to the fishery economics of the region, the current fishing situation at East Hole was re-evaluated.

The results of the re-evaluation indicate the original analyses were very conservative and in fact, considerably more fishing takes place in and around East Hole. A representative of the Point Judith Fisherman's Cooperative Association, Inc., indicated that commercial fishermen take good catches from the East Hole and surrounding area. However, he did not know what the yield or species group of the landed fish were. Fishermen had been interviewed previously when preparation of the DSEIS was underway but the only information obtained at the time was generalities in fishing areas (including the East Hole area). When an area fisherman was recently asked specifically if he and any others fished the bottom of East Hole, an affirmative reply was obtained. He indicated he often fishes East Hole with good catches of blackback flounder, ocean pout, fluke and scup. Earlier this spring one fisherman caught 9,000 pounds of ocean pout in 3 hauls of his trawl. Hangs can be encountered by inexperienced fishermen. However, a trawl may be taken up the side of East Hole diagonally and with the use of Loran and sonar the site can be fished without problem. A sunken airplane is located on the Loran A 3H5-2020 line at 29 fathoms.

While East Hole and its surrounding areas are much more extensively fished than previously believed, fishermen report that the area has to be periodically rested. Under these terms East Hole itself and the surrounding area can be classified as a moderately fished site.

In many areas, ocean pout is considered ground fish with a low market value. However, in the Block Island, Rhode Island area where much fish is processed at Point Judith, ocean pout has a significantly higher market value. Recent attempts to market pout fillets from Point Judith have been most successful.

IV.D.1.d. Area Fishing - East Hole

In addition to fishing within East Hole itself, commercial fishing interests extend into Gardners and Napeague bays where trap netting and trawling are practiced. In open water areas surrounding East Hole and extending further into Block Island Sound, commercial fishing takes place year-round. The National Marine Fishery Service (ref. 234) reports the annual hail for NMFS statistical area 539 (Block Island Sound, Rhode Island Sound, Narragansett Bay) to be 72,306,600 pounds during the period 1965-1974. Rhode Island landings during 1973 are reported to be 86,848,000 pounds of fish (foodfish, menhaden, industrial groundfish) with a value of $8,508,000 (ref. 160). The species composition of the landings are presented in Table 10. There were also landings in New York and Connecticut ports but data on these are not readily available because of the format of the reporting statistics.

TABLE 10

1973 Landings of Principal Species

	%total lbs.	$total $
Yellowtail	19.5	24.4
Menhaden	16.5	2.1
Herring, sea	9.6	1.6
Blackback	4.5	6.0
Scup	3.4	5.7
Whiting	3.2	2.1
Cod	3.1	3.3

TABLE 10 Contd.

	%total lbs.	%total $
Other food fish (including squid)	10.6	14.9
Mixed industrial	24.9	2.3
Lobster	2.7	34.6
Shellfish (meats)	2.0	3.0

From Olsen & Stevenson (ref. 160)

The catch of the commercial fishery is dependent on the seasonal migration of the various species. While the entirety of the study area is fished, there are grounds which are more heavily trawled than others as indicated in Figure 6-13 (Vol. I, SEIS). Olsen and Stevenson (ref. 160) indicate the principal food fish species caught in Block Island and Rhode Island Sounds include: winter flounder, yellowtail flounder, fluke, scup, butterfish, cod, haddock, whiting and hake. The most numerous of the ground fish species are: sculpins, searobins, goosefish, ocean pout, rays, and juveniles of the food fish species.

As noted in the FEIS, there is also a lucrative sport fishing and boating industry in the Block Island and Rhode Island Sound area. Fish commonly caught for sport include flats, blues, striped bass, and tuna.

IV.D.1.e. Site Shellfish - East Hole

Ocean quahaug is the only commercially important shellfish found at East Hole. However, the density of this species varies in the Hole and abundances increase the further up the flanks one proceeds. Harvesting of the shellfish in East Hole itself is not known to take place at the present time.

IV.D.1.f. Area Shellfish - East Hole

The most important shellfish in Block Island Sound is the ocean quahaug, and an active and expanding commercial fishery is found there. Commercial landings in Rhode Island for 1975 amounted to $250,000 (ref. 170) of which the majority originated from the sound areas. Recent harvests may be even higher, since this clam is replacing

the surf clam in commercial use. Dense beds are presently being harvested in areas indicated in Figure 6-15 (SEIS Vol. I). It is not unusual for a good crew to return to port with up to 350 bushels for 5 hours of effort. The density and expanse of the beds make this shellfish a valuable resource and harvesting of other stocks in the Sounds can be expected in future years as the commercial importance of this clam increases. As indicated in the SEIS the extent of shellfishing in the Block Island Sound area is at present limited by the availability of harvesters, not shellfish stocks. A representative of Blount Seafood in Warren, Rhode Island, was asked his opinion of the sustainable yield of _Arctica islandica_ in the areas fished in the Block Island, Rhode Island Sound areas. He reported that the yield had a value of $1.5 million at the boat and a cost of over $10 million to the consumer. He also reported that three new boats are now being outfitted with hydraulic shellfish dredging equipment. Therefore, as the SEIS reports, a _dramatic_ increase in ocean quahaug harvests is to be expected within the next half-decade. Harvested areas will extend from those heavily harvested at the present time to others now less intensively fished, including the East Hole area.

IV.D.1.g Site Lobstering - East Hole

Lobster potting in East Hole itself has not been reported. However, lobster is known to inhabit the site since it was found in all the summer trawls made by MACFC in East Hole. It is also possible that lobster use East Hole as an over-wintering area and migrate to shallower areas during the summer.

IV.D.1.h. Area Lobstering - East Hole

The Race is the most heavily lobstered area in the vicinity of East Hole. Thus, the same data base that is presented below in the discussion of New London area lobstering applies to East Hole, as well. The value of lobsters landed at locations in Rhode Island but caught in this area is not known.

IV.D.2. _New London Biology_

IV.D.2.a Site Biology

The biology of this site has been extensively monitored in connection with the Navy spoil disposal operation. As of the Fifth Quarterly Report (ref. 232), the dredge spoils supported a diverse group of organisms. Dominant among

these are the bivalve *Nucula proxima*, the polychaete worm *Nepthys incisa*, and the amphipods *Ampelisca vadorum* and *Leptocheirus pinguis*. At station C6 (the main disposal site), predisposal samples contained an average of 52 species per $0.1m^2$. (See Table 9) Following disposal the species numbers per $0.1m^2$ dropped to 1.20 in October 1974. As of June 1975 the species numbers had increased to 5.67 and in October 1975 there were 9.8 species per $0.1m^2$.

After the initial disposal of dredge material (Fall 1974) the mean diversity index within the entire New London Site rose from 2.48 (Summer 1974) to 3.0 (Fall 1974). A sharp decline to 1.22 occurred during the winter of 1974-1975 followed by an even lower diversity of 1.07 for spring 1975. The next two seasons of summer and fall 1975 showed increases to 1.88 and 1.92, respectively. Although seasonal variations influence diversity indices throughout the year, the comparisons between the two seasons summer 74 - summer 75 and fall 1975 show a trend of diversity indices returning to pre-disposal values. Again at the main disposal location, station C6, diversity indices went from a predisposal value of 2.79 to 0.14 in October 1974. During June 1975 the species diversity had risen to 1.27 and in October 1975 it was 1.92. Biological dive studies have also indicated the decline in benthic species as a result of disposal. However, repopulation of the mound by *Cancer* crabs, lobsters, hermit crabs, polychaete worms, amphipods, sand shrimp, seastars, flounder, fluke, and skates has been observed. The dredged material is not unfavorable to habitation and MACFC has stated that "small spoils were supporting considerable biological activity." (ref. 232)

IV.D.2.b. Area Biology - New London

The biology of the Thames River has been discussed in the FEIS and SEIS. The ampeliscid assemblages and their seasonal variations in Fishers Island Sound have been researched by Biernbaum (ref. 13).

Ecology in the Niantic area has been investigated by several researchers. MACFC (ref. 225) analyzed grab samples from the proposed Niantic disposal grounds. Medium sands characterized the sediment composition and the depth was 24 meters. The Shannon Weaver diversity index was highest of the four regional disposal sites being considered within Long Island Sound. Coarse sand fauna was characterized by the presence of the polychaete worm

Nepthys picta and the decapod Cancer irroratus. Numerous polychaete worms were obtained such as Aricidea jeffreysii and Tharyx annulesus. Amphipod species included Ampelisca abdita, Unciola inermis, U. irrorata and U. serrata. As part of environmental work for the Millstone Nuclear Power Plant an investigation of the finfish resources in Niantic Bay has been published by Northeast Utilities Company (ref. 156). The report lists 52 finfish species to be found in the Bay itself.

The faunal assemblages of Long Island Sound were sampled and analyzed by MACFC (ref. 225). Faunal assemblages were found to be dependent upon the depth of the water column and substrate composition. The most prevalent assemblages were found in silt-clay sediments at 14-40 meters in depth, and coarse sand sediments. The coarse sand sediments were found in both deep and shallow waters.

Much of the macrofauna in the center of Long Island Sound were obtained in 14-40 meters of water in the sediments comprised of over 68% silt and clay. The soft bottom community was characterized by Nepthys incisa and Mulinia lateralis with co-dominants of Pherusa affinis and Melinna cristata. Other macrofauna included Pitar morrhuana, Retusa canaliculata, Yoldia limatula and Ampelisca abdita. Sanders (ref. 185) found bottom communities throughout Long Island Sound to be characterized by Nepthys incisa and Nucula proxima. MACFC (ref. 225) found a similar assemblage during the summer, however the Mulinia lateralis continued to prevail over Nucula proxima. It has been suggested by these investigations that the recent dominance by Mulinia lateralis could be the result of environmental fluctuations during the past twenty years. (ref. 225)

The characteristic bottom materials of the northern shore of Long Island were sediments of coarse sand in 2-6 meters of water. The faunal assemblage was composed primarily of Nepthys picta, Spisula solidissima, among others in such sand bottom assemblages. A similar assemblage of macrofauna existed in coarse sands at 20-40 meters. The aforementioned organisms were obtained plus other organisms found in deep silt-clay sediments such as Ampharete arctica, Tharyx acutus, Polydora ligni, Nassarius trivittatus and Cancer irroratus.

Along the Connecticut and New York coast grain sizes intermediate to silt-clay and coarse sand sediments were obtained. Organisms from both the silt and sand faunal assemblages were obtained within this area.

AD-A031 434 NAVAL FACILITIES ENGINEERING COMMAND PHILADELPHIA PA --ETC F/G 13/2
FINAL ENVIRONMENTAL IMPACT STATEMENT, DREDGE RIVER CHANNEL: NAV--ETC(
SEP 76

UNCLASSIFIED NL

2 OF 6
AD
A031434

Although Sanders (ref. 185) and MACFC (ref. 225) found diverse and numerous organisms in the western portion of Long Island Sound, subtle differences in the assemblages suggested influence from contamination. The predominating organisms from the different assemblages were still found in the western portion, however increases of spionid, cirratulid and capitellid worms were indicative of heavier contaminant loads.

IV.D.2.c. Site Fisheries - New London

In the course of the dredged material disposal monitoring studies, at New London, finfish sampling has been conducted and the following species of fish have been found in and around the site: fluke, little skate, windowpane, winter flounder, scup, planehead filefish, cunner, tautog, northern searobin, butterfish, rock gunnel, longhorn sculpin, sea raven, grubby, red hake, ocean pout, alewife, hog-choker, smelt, Atlantic silverside, and American sand lance. Of the above, winter flounder, longhorn sculpin, and skate were most abundant. (refs. 228 through 232)

IV.D.2.d. Area Fisheries - New London

The commercial trawl fishery in the area is limited. Fishermen specifically avoid the disposal site itself. The extent of a trawl or seine fishery further into Long Island Sound is discussed under the Orient Point, and Cornfield Shoals dump sites in Section 6 of the SEIS. Sport fishing for flounder, fluke, striped bass, and bluefish is common but certainly not as extensive as other nearby areas, such as the Race area. The Thames River itself has bluefish, mackerel, striped bass, smelt, anadromous runs of glut herring and alewives. Young of-the-year menhaden are also found. Black sea bass, fluke and winter flounder are found in Fishers Island Sound and waters off the New London Light.

Sport fishing out of New London takes place southeast of the disposal site or at the Race. Interviews with representatives of Burr's Marina and Marster's Marina indicated that there apparently is no effect on sport fisheries from previous disposal at New London -- at least directly attributed to the disposal. The Marster's Marina representative in New London noted a 20% decrease in blues between 1974 and 1975. He did say, however, that he would not directly attribute this to the disposal, since blues run in two-year cycles. Most of the sport fishing in the vicinity of the Site takes place SE of the actual site. Very little occurs directly over the site. Most of the

fishing is family oriented with 16'-46' boats. The season is in early spring and late fall for school bass. The problem now is that there is very little bait because of menhaden harvesting. There has been a steady decrease over the past 5-6 years of school blue which are found primarily S of the SW ledge. Charter boats fish primarily near the Race. On a good day, 40-50 boats go out from Burr's Yacht Marina. 25'-40' boats primarily cruise rather than still fish.

Both commercial and sport fishing takes place in the Niantic area. Commercial fishing is reported (through interviews) to take place further from shore and includes some fishing near the New London Site. Scaup is the principle species caught. The sport fishery is located both into Long Island Sound itself, as well as a favored area at Black Point. Principal species caught are striped bass, bluefish, winter flounder, and fluke. The value or yield of the finfishing in this area is not known. Several charter boats are berthed at Niantic. Menhaden fishing periodically takes place in this area and easterly. Some sportfishermen have indicated they noticed a drop in blues population after menhaden had been fished out.

The New England River Basins Commission report on Long Island Sound (New England River Basins Commission, 1975) lists the 61 most common finfish species, of over 100 species, known to exist in Long Island Sound (Table 6-3; Vol. I, SEIS). The majority of these fish are permanent residents of the Sound. The spawning and migration habits of 16 of these species are presented in Table 6-4; Vol. I, SEIS. Of the 16 species, all except bluefish, butterfish, fluke and gray fish sharks appear to spawn in the Long Island Sound region. Butterfish spawning can take place in Rhode Island and Block Island sounds. Bluefish and fluke are believed to spawn in deeper waters off the coast. The basic seasonal migration patterns are two types. These are either offshore-to-inshore and inshore-to-offshore as in the case of bluefish, butterfish, fluke, swellfish, scup, sea robins, and mackerel, or south-to-north in summer and north-to- south in winter as exhibited by striped bass, menhaden, and grayfish sharks. Offshore movement may also be combined with a southern migration, or inshore movement combined with a northern migration, as weakfish and sea bass are known to do.

IV.D.2.e Site Shellfish - New London

With the exception of a limited number of bivalve species in the disposal site, there are no major shellfish stocks *per se*. The most abundant bivalve is *Nucula proxima*, a

small but common organism. In areas north, northwest and northeast of the dump site there are other species of shellfish.

IV.D.2.f. Area Shellfish - New London

The density and distribution of shellfish in the area varies, but includes: bay quahaug, soft-shelled clam, oysters, conchs, moon snails, mussels, and bay scallops. The distribution of soft-shelled clams, oysters, and bay scallops is limited to shallow bays, channels, and estuaries. Bay quahaug and oysters are present in the Thames River. Many of the soft-shelled clam and bay quahaug beds have either been damaged by pollution, or may be harvested only if the catch is treated by depuration prior to sale.

Shellfish stocks in the Niantic area include bay quahaug, oyster, bay scallop, and soft shelled clams. The quahaugs are harvested by commercial shellfishermen through special permits from the Connecticut Department of Agriculture, Aquaculture Division. Bay scallop stocks are found primarily in the Niantic River where harvesting is controlled by the Town. The yield and value of any of the shellfish harvests is not known. The only shellfish harvesting known to be conducted in the Groton area is scalloping in Fishers Island Sound and shallow bays near Pine Island. Although quahaug and oyster beds exist in the area, harvesting is restricted to a special permit due to water pollution. Harvesting was restricted even prior to the initial dredging.

IV.D.2.g. Site Lobster - New London

The quantity and quality of lobster at the New London Site has received much comment. Lobsters inhabited the disposal area before disposal of Phase I sediments and are presently on the new mound. The relic pile in the northeast corner was inhabited by crustaceans in 1974 and lobster numbers in the disposal site are expected to increase as a result of increased habitat.

During the course of monitoring, MACFC examined the possibility of lobster contamination from lobsters caught at the New London dump site and surrounding areas. These data are presented in the Sixth Quarterly Monitoring Report (ref. 306) and are summarized in Section III of this volume. No systematic changes in heavy metal content of New London lobsters between predisposal and July 1975 have been found. Concentrations of chromium, nickel, and lead were below detection limits in all cases. Comparisons of these

concentrations with data on lobsters taken from off-shore areas from the northern coast of Maine to Maryland (ref. 294) indicate that the New London lobsters do not contain higher levels of copper, silver, cadmium, or zinc in their muscles. It should also be pointed out that there is a large variability in concentrations between animals from the same location, particularly in copper concentrations. Additionally, when comparing data of claw and tail muscles combined to data of either muscle separately, the claw appears to contain higher concentrations of some metals with copper among them.

IV.D.2.h. Area Lobster - New London

A small lobster fishery exists in the Thames River itself. Sets of pots, however, become heavier on offshore shoals and ledges towards Niantic, Avery Point, Pine Island, and Fishers Island. Lobstering takes place in Niantic Bay as well as adjacent nearshore and offshore areas. In comparison to other Long Island Sound disposal sites, the lobster fishery at Niantic is surpassed by the Fishers Island and Race areas and Long Sands Shoals and Cornfield Shoals.

The NMFS reported that, during 1975, 186,400 pounds of lobster, valued at $386,290.00, were caught in Long Island Sound and landed in Suffolk County. Due to the nature of the reporting statistics, the catch in Long Island Sound landed at Suffolk County is as close as the data will allow to the value of the lobster fishery on the Race and Fishers Island area. The New York Department of Environmental Conservation at Stony Brook reports New York lobster landings for the entire of Long Island during 1975 to be valued at $474,000.00 (average price of $2.09 per pound to the boat). (Briggs, personal communication) It was also indicated that approximately one-third of the $474,000.00 was caught in the Race-Fishers Island area. This would result in an approximate value of New York landings from this area of $156,000.00 to the boat.

Lobster landing and value data for 1975 is now available from Connecticut. The landing and value data for fishing areas 1 and 6 (which correspond to the Race, Plum Island, Fishers Island, and the Connecticut coast from Old Saybrook to Stonington and Rhode Island), indicate 1975 landings of 241,680 pounds at a value of $471,171.00.

A summation of the New York and Connecticut data of the area gives a value of approximately $629,171.00. Assuming the lobstermen do not factually report their total catch, a conservative factor of 50% puts the potential boat value of the lobster fishery at $1,258,342.

IV.E. OTHER USES

No new information on the "Other Uses" category has come to light since the publication of the Draft SEIS. There are still no reported uses of the New London Site other than dredged material disposal, and the dominant use of the East Hole Site is still the FORACS Range. There has been further investigation of the possibility of avoiding conflicts between disposal at East Hole and the use of the FORACS Range.

The Fleet Operational Readiness Accuracy Check Site IV (FORACS IV) at Fishers Island, New York, is a precision test range designed to measure the shipboard sensor system accuracies. These sensor systems include sonar, search and gunfire control radars, radio direction finding and navigation systems. The shipboard sensor system testing is accomplished with the aid of surveyed shore based optical tracking stations on Fishers Island which continuously track the test ship or the submarine periscope. Sonar acoustic targets are installed on the ocean floor in the middle of the test range and connected by cable to the shore based control station on Fishers Island. Passive and active radar targets are positioned to aid in the sensor data collection process. Other factors include periodic testing of submarines to provide AN/ -7 calibration services and weekly water sound velocity measurements on the test range.

The most difficult sensor to test is the sonar system and in particular the submarine passive sonar systems. The precision measurement process requires a reasonably quiet operating area enabling the achievement of high signal to noise ratio. Current operations with submarines are accomplished by requesting any approaching ship to stay clear of the test area over an FM Marine radio. Of particular concern is the safety of personnel and ships during submarine testing since the measurement technique requires submerged operations for an 8-10 hour period.

The Fishers Island FORACS test range is the only Navy ship test facility of its kind on the U.S. East Coast. The closest FORACS is located in the Bahama Islands off the coast of Florida. With the increasing costs of fuel and the reduction in ship's operational sea time, the Fishers Island FORACS is becoming an increasingly important Fleet support facility for New England based ships and submarines.

The location of the proposed alternative disposal site for the Thames River dredging project will adversely affect the

Fishers Island FORACS test operations. Use of the alternate site (East Hole) would require heavy traffic to pass through the FORACS causing disruption of testing, possible erronious passive sonar measurements and increase the hazard to submerged submarines on the test range. This disposal site would be acceptable to FORACS operations if the dredging barges are routed North of Fishers Island or far to the South of the FORACS test range.

IV.F. REGULATORY CONSIDERATIONS

The intent of the Regulatory ranking, as discussed in paragraph 6.419 of the SEIS, is to favor sites at which several interested governmental bodies would have a hand in overseeing the disposal process. This is felt to be an aid in insuring that the operation is carried out in conformance with permit conditions and best available

The New London Site is the most highly regulated site in the area. It has been operated in compliance with both State of Connecticut and Federal laws and efforts there have been closely scrutinized.

The East Hole Site lies beyond the boundary of State waters, and would be coordinated solely at the Federal level by the EPA and Corps of Engineers. While this might involve close scrutiny of the disposal effort, the reduction in the number of interested governmental bodies and the greater distance to the site would make more difficult the task of policing the disposal operation.

Additionally, some weight must be given to the data base on disposal effects which is being developed at New London. This two-year effort, and its potential for further insights into disposal problems, would be lost if another site were chosen.

IV.G. COSTS

The cost of disposal at East Hole was not weighted highly in the SEIS. It played essentially no role in the ranking of East Hole as the third site in order of preference. Elimination of cost from the ranking procedure (see Table 6-11) made no change in the site rankings.

Firm Cost estimates are difficult to establish. The State of Connecticut, Department of Environmental Protection, discussed the relative costs of disposal at New London and at East Hole in "Dredging and Dredged Spoil in Long Island Sound: A Discussion Paper". (ref. 49) The DEP paper assumed that incremental cost per mile would be about $0.05 per cubic yard. This estimate, which seems fair, would mean an additional cost of about $0.60 per cubic yard for Navy Phase 2 spoil were it to be disposed of at East Hole instead of New London. The paper also suggests that equipment costs related to "lost time" because of the weather factor in the open waters of Block Island Sound would add 20% to total costs. This also seems reasonable, based on an analysis of some data from the Corps of Engineers on relative costs of disposal of spoil from the Providence River at a number of sites. (ref. 210) The latter source would also suggest that monitoring costs at East Hole would be about 2.5 to 3 times those for the close-in New London site. Some limited monitoring has already been accomplished at East Hole, providing at least a partial baseline data bank. However, the greater depths, the greater distance from base of operations, and the rougher seas (including stronger surface tidal currents) to be expected at East Hole would all argue in favor of significantly greater monitoring costs there than at New London.

Let us assume that dredging, transport, and disposal costs at New London will be $2.70 per cubic yard, plus about $0.30 per yard for monitoring costs. Under these assumptions, Phase 2 dredging (1.845 million cubic yards) would cost $5,535,000. Incremental transport costs to East Hole would add $1,107,000. Neglecting monitoring, total costs to East Hole, including the 20% equipment factor mentioned above, would be $7,970,000. Monitoring at $0.75 per cubic yard would add another $1,384,000. This brings total costs at East Hole to $9,354,000, as compared to $5,535,000 for New London.

IV.H. DISTANCE/DILUTION

It has been postulated by some reviewers of the Draft SEIS that dispersal of material from the New London Site would have much more serious biological consequences than would similar dispersal from the East Hole Site. This argument can be called the "Distance/Dilution" theory. It states that, if materials are dispersed, the potential for ecological harm is greater for a disposal site close to shoreline areas (Distance) than for a more distant site, because of relatively smaller concentrations of contaminants in the water in the latter case (Dilution). Thus, it should be noted that this particular set of comments is concerned with the relative consequences of hypothetical dispersal of materials at some time after deposition, not with whether or not such dispersal will take place. It should also be noted that, since East Hole is much farther from the Connecticut shore area of Long Island Sound than is the New London Site, the argument is unassailable in the terms in which it is stated.

However, the "Distance/Dilution" concept rests upon a number of critical assumptions, not upon demonstrated factual data.

1. It requires that the spoil not be contained at the dump site but rather migrate from the site, in substantial quantity, over time.

2. It further requires that the migrating material subsequently come to rest in biologically rich nearshore areas variously described as estuaries, in-shore nursery and fishing areas, rich nursery areas, and productive and important coastal fisheries areas. The exact location of such areas is not specified, although the context suggests it is the coastal area between the mouth of the Thames and Niantic Bay.

3. It further requires that migration and subsequent redeposition of materials from the disposal area lead to "long term" and "chronic" but otherwise poorly defined adverse impacts on the biotic resources of the impacted area. It is suggested that benthic fauna will be affected by pollutant uptake and that this will lead to subsequent impacts on lobsters, crabs, bottom feeders such as flounder, and on demersal fish (both native and visitors). It also suggests that filter feeders (soft and hard shell clams, e.g.) will

concentrate pollutants from the spoil. It raises the possibility of concentrations of pollutants which will be directly harmful to the marine animals and which will represent a threat to human health, particularly if bio-magnification takes place.

4. It finally requires that the area in close proximity to the New London Site be accepted as of much greater biological importance than the area in close proximity to East Hole.

The Navy does not believe that substantial amounts of dredged material deposited at New London will leave the site. On the contrary, it believes (based on actual observation) that the containment qualities of the New London Site are at least as good as those of East Hole. If the Navy's observations are correct, the question of transport of the material into near shore areas, where it may lead to adverse biological impacts, becomes academic. Additionally, the Navy does not believe that if materials do leave the site they will end up along the Connecticut shore of eastern Long Island Sound.

Prior to commencement of Navy Phase 2 dredging, about 6,000,000 cubic yards of material was deposited at the New London Site over a period of roughly thirty years. If the postulated migration takes place, all or most of this material should have left the site. The area of shallow water within the three fathom line between New London and just west of Niantic has been measured with a planimeter. It amounts to 6.4 square nautical miles. If the 6,000,000 cubic yards of spoil had ended up there the entire bottom would be covered with 6.7 inches of silt and clay. However, sediment sampling done by MACFC (ref. 225) indicated an absence of such a silt layer; the bottom consists of fine sand.

It might be argued that the material actually migrated to the northeast, along the Connecticut shore of Long Island and Fishers Island Sounds between Groton and Stonington. Had this occurred, the area should be covered with a bottom layer of 4.3 inches of silt/clay. In fact the bottom is composed of fine sand, both in the Sound and in the harbor and bay areas, with gravel in a few places. (ref. 225)

If uniformly spread over both areas east and west of New London, the resulting bottom layer would be 2.6 inches thick. There is no such layer. (ref. 225)

Another possibility would be the gradual drift of sediments from the New London site back into the Thames River from

which they had been drawn. In general, as the Connecticut Department of Environmental Protection (ref. 49) has pointed out in a discussion paper on dredging and spoil disposal, the major source of river and harbor sediments requiring dredging is from materials migrating inward from Long Island Sound. (Not necessarily as far offshore as the disposal site.) However, the indications are that material from the New London site has not returned to the Thames River estuary (Personal Comm. D. Tolderlund, 1976). Studies by MACFC of suspended solids and coliform show a net transport out of the river for both. The grain size of lower river sediments has been found to be considerably larger than for sediments characterizing the site prior to the commencement of Phase I disposal. Also, the Corps of Engineers reported in an Environmental Statement on proposed channel dredging in the Thames (ref. 214) that "because of its channel configuration and hydrographics [the river] requires little or no maintenance."

Physical evidence presented above suggests that no substantial amounts of material have moved into the eastern edge of Long Island Sound along the Connecticut shore, into the Thames River, or into the western portion of Fishers Island Sound near the Connecticut shore. If we accept for the sake of argument that there has been such movement at all, where would the material have gone?

One possibility would be transport out through the Race toward open ocean. However, studies of currents in the area suggest that even material exiting on an ebbing tide would be returned on the much stronger bottom currents of the next flood tide. These flood tide bottom currents tend westerly toward the middle portion of Long Island Sound. Suspended materials appear to be deposited in the central basin of the Sound (not along the shorelines), with some going as far as Eaton's Neck. The Connecticut DEP selected candidate dumping sites off the mouth of the Connecticut River, off New Haven, and off Eatons Neck at least partly on the presence of such a mud-filled depression in mid-Sound. This is not to say that sediments from New London have played a major role in forming such deposits; rather, the point is that, <u>if</u> migration does take place, this area would be the most likely place for their redeposition.

Sediment samples provide some slight evidence in support of these conclusions. MACFC (ref. 225) found silt as an important constituent in only three samples taken in the area between Niantic and the eastern end of Fishers Island Sound. Just to the north of the dump site a sample

consisted of mixed silt and sand; this could represent migration of fines or, more probably, a short dump. A sampling site towards the Race and close to or in the dump site itself was predominantly silty. A third site to the southwest and below Niantic, but closer to the Long Island than the Connecticut shore, also was mostly silt. Thus, the physical evidence would suggest that, if the older materials have moved at all, they almost certainly have not been deposited along the Connecticut shoreline.

The argument for the hypothetical biological impacts is also suspect. The Navy knows of no evidence for substantial uptake of heavy metals or like contaminants by other filter-feeding shellfish in the disposal area. Monitoring studies have in fact revealed such uptake in Thames River shellfish. This probably reflects pollutants in the water column, plus some intake from bottom sediments. The studies also indicate that contaminant levels have been decreasing, undoubtedly reflecting improved controls over point source discharge of industrial pollutants and better treatment of sewage wastes in the Thames River watershed.

Taking of shell fish for human consumption without depuration in the Thames and in most of the near shore shallows between Jordan Cove and Stonington is prohibited because of severe contamination from bacteria. (Baker, personal communication) This is a legacy of long neglect of sewage treatment. It does not appear in any way to be related to dredged materials deposited at New London. In fact, MACFC studies have shown that coliform concentrations over the New London site are higher on an ebbing tide than on a flood tide indicating that the River is a stronger source of bacteria than the dredged material. (ref. 232)

While the commercial fishery has been found to be less important than at and near East Hole, there is a sport fishery. This includes the taking of bottom feeders such as flounder. There are few records of analyses of such fish from the New London area. Those the Navy has found (Fredette, personal communication) indicate that levels of heavy metals are comparable to those found in other areas which are heavily fished and, additionally, appear not to be of significance in terms of threats to human health.

Since the cessation of Navy Phase I dredging, lobsters have colonized the area in which the dredged material was deposited. They are sometimes taken by commercial fishermen. They are healthy and tissue analyses have been carried out by MACFC. They reveal no increases in heavy

metal content of New London lobsters between the period before disposal began and the summer of 1975 after Phase I disposal had been completed.

In short, in spite of a past history of dredge material disposal of Thames River sediments extending over decades at the New London site, the Navy has found no evidence to support the dispersal and subsequent redeposition of large amounts of material in the near shore waters of Connecticut. The Thames estuary has a long history of contamination by industrial and municipal pollutants, yet the River and adjacent waters along the shore line also appear to be biologically healthy (save for the contamination attributable to past poor sewage treatment and disposal practice mentioned earlier.) This area does not represent a prime commercial fishing resource; it is used for sports fishing. Neither the limited commercial fishery nor the sports fishery appears to have been adversely impacted as the result of past disposal of millions of cubic yards over periods of decades at New London.

This would suggest that the dire consequences predicted as a probable result should the Navy's Phase II dredging involve disposal at New London are simply not realistic. Material movement from the New London Site appears to be minimal. Even if such movement should occur, the likely transport direction is initially to the southeast, with ultimate deposition in central Long Island Sound. And, even if movement towards the coast should occur, studies at the disposal site, which show no extended adverse effects, indicate that near shore effects would probably be minimal as well. The probability of such effects would appear, on the information cited above, to be very low indeed.

In contrast, the bottom and the waters at East Hole and on the Block Island Sound side of Fishers Island are both unpolluted and biologically productive, supporting substantial commercial shell and fin fisheries. In fact, the Draft SEIS under-rated the value of the fishery in this area because of a difficulty in obtaining good data on sizes and values of catches. Since the possibility of using East Hole as a disposal site has become known, fishermen from Rhode Island and Connecticut have come forward with factual information on the value of the fishery there and have registered objections to the disposal of dredged materials in or near this good fishing ground. (See Comments 50 and 51, Section V of this volume)

The Navy's studies lead it to believe that dispersal from East Hole is as likely as from New London. Should

materials be deposited there and later be dispersed, and should such dispersal represent the kind of biological hazard postulated in some of the comments, the effects would be felt west of the Hole, in the nearshore waters of Fishers Island and in Long Island Sound. By the time such sediments reached the central portion of Long Island Sound they would indeed, be greatly diluted. But so would New London sediments, which would probably also end up in the same portion of Long Island Sound should they migrate. The marine resources in and near East Hole are of greater value than those in and near the New London Site; and the introduction of contaminants of whatever level into a clean environment of established productivity, such as East Hole, is not ecologically desirable. In contrast, New London has a long history of usage for dredged material disposal, with no definitely established extended adverse impacts. Its continued use for this purpose would appear to be sounder environmentally than introducing such materials into an essentially pristine area.

IV.I. SITE COMPARISON

The detailed data presented above on East Hole and the New London Site allows a comparison to be made between the two at a precision not possible in the more general comparison of fifteen sites in Volume 1 of the SEIS. The comparison therein is based on the available data at all of the sites, not just East Hole and New London. Thus, the level of detail at which the comparisons are made is restricted by the data bases for the less well-known sites. In the more detailed comparison of East Hole and New London which follows, the extent and quality of the data base allows very precise rankings of these two sites at a level not possible for the other alternative sites.

The Distance/Dilution element proposed by some commentors has been discussed above and seems not to be of direct applicability. A simple linear measurement to the nearest coastline does not accurately reflect the possible directions of transport, should it occur, nor does it account for the amount, kind, and value of the resources which might be at hazard. Instead, the criteria list has been adjusted to separate the immediate environment of the sites from the nearby areas which might be impacted should material migration occur. Thus, in the place of "Biology" and "Fishing", the revised criteria include "Site Biology", "Site Fishing", "Area Biology", and "Area Fishing".

For the purposes of descussion, weightings have been revised to favor more strongly some elements in the criteria list, while decreasing the importance of others. Retention is considered to be the most important single criteria. As a measure of the relative containment properties of the sites, it is raised from 30% to 35% in weight. Capacity retains its weighting of 5%, since both East Hole and New London will hold more than sufficient volumes of material for the dredging requirements of the next decade. The two Biology categories and the two Fishing categories were each weighted at 10%, for a total of 40%. In Volume 1, the Biology and Fishing categories have a combined weight of 35%. Other Uses is reduced from 15% to 5% to reflect the possibility of scheduling to avoid conflicts with the FORACS Range. Regulatory and Cost retains their weights of 10% and 5%, respectively.

Retention

The relative containment ability of the two sites must be judged in terms of native sediments, maximum tidal current velocities, and wave-induced current velocities. Native sediments at New London are somewhat finer than at East Hole (silty very fine to fine sand versus silty fine sand). Maximum tidal bottom velocities at the two sites are very nearly equal, and neither site has shown velocities sufficient to exceed the erosion velocity of Thames River sediments. In terms of wave-induced current velocities, East Hole has a slight advantage over New London. The probability of exceeding the erosion velocity of Thames River sediments by the combined influence of waves and maximum tidal velocities is 0.65% at New London, and too small to measure at East Hole.

In sum, New London has a slight advantage in sediments, the two sites tie in tidal current velocities, and East Hole has a slight advantage in wave-induced current velocities. On purely physical grounds, then, the two sites are tied and both receive a ranking of 1. On the grounds of monitored relative containment ability, New London would be favored, since materials have remained there over a winter season and under the influence of Hurricane Belle. There is also evidence that a relic mound of dredged material with a top surface at a depth of only 36 feet has remained stable at the site since at least the early 1970's. This provision has been made in the ranking by assigning New London a rank of 1 and East Hole a rank of 1 or 2.

Capacity

An argument can be made for eliminating the capacity criteria altogether, but it favors East Hole and is thus, left in. East Hole, with a theoretical capacity of 50 million cubic yards, is ranked 1; New London, at 41 million cubic yards, is ranked 2.

Site Biology

Inventories of the biology of the two sites indicate that benthic fauna is slightly more diverse at New London than at East Hole. Lobster stocks are similar at the two sites, as are the shellfish stocks. Finfish populations are better developed at East Hole than at New London. The total site biology resource at East Hole is thus of somewhat greater value than at New London. None-the-less, since the rankings are close, the two sites are tie-ranked at 1 each.

Site Fishing

Recent information has corrobarated the presence of a valuable finfishery at East Hole which was indicated by data in the Draft SEIS. Lobster and shellfishing at the two sites are about equal. The combined evaluation showed East Hole to be clearly more valuable than the New London Site. Rankings were 2 for East Hole and 1 for New London, reflecting suitability for disposal.

Area Biology

The areas around the two sites are similar in many respects to the sites themselves. Both are quite similar in terms of benthic fauna, East Hole is somewhat richer in fish and shellfish, and New London is somewhat richer in lobster stocks. The combination favors East Hole slightly, but a tie rank is applied.

Area Fishing

The area near East Hole supports important fin and shell fisheries and a limited lobster fishery. There is a good, but seasonal, lobster fishery in the New London area and some summer sport fishing. There are no important shell-fisheries. On the balance, East Hole is judged to be of significantly greater value as a commercial fisheries resource area than the New London area. East Hole is ranked 2 and New London 1, in terms of disposal suitability.

Other Uses

As noted above, the only known "other use" of the New London Site has been dredged material disposal. Disposal at East Hole could cause conflicts with the operation of the FORACS Range, but these could be resolved by scheduling. The existence of the FORACS Range forces a ranking of 2 for East Hole and 1 for New London, but the scheduling possibilities lead to a reduction in weight assigned to this category from 15% to 5%.

Regulatory

The stronger interest in and concern for the effects of disposal at New London appear to guarantee continued watch-fulness over operations at this site, making it somewhat preferable to East Hole. A ranking of 1 for New London and 2 for East Hole is assigned.

Cost

The discussion of costs above shows a penalty of nearly $4,000,000 for East Hole. This requires a ranking of 2 for East Hole and 1 for New London. As was the case in the Draft SEIS, however, Cost is considered of secondary importance and weighted at only 5%.

Summary

Following the procedures used in the SEIS, the following matrix comparison (Table 11) was made between the two sites, based on the rankings and weightings just discussed.

These results indicate that, in terms of both raw scores and weighted scores, New London is preferable to the East Hole as a dredged material disposal site, even giving East tie ranks where New London was found to be slightly more favorable (such as Site and Area Biology). If the monitored relative containment characteristics at New London are used in the ranking, the preference becomes even more pronounced.

Additionally, these rankings and results were compared to the results contained in Figure 6-22 of the SEIS. No inconsistencies were noted; the relative ranking of East Hole and New London remain the same, whether a 1 to 4 scale is used, as in the SEIS or a 1-2 scale as in Table 11.

Also, the influence of the proposed changes to weighting on the original nine site matrix was investigated. If Retention is increased in weight to 35%, Fishing increased to 20%, and Other Uses reduced to 5%, the site ordering is as follows:

New London
Containment 1
East Hole
Munitions tied
Browns Ledge
Rhode Island Sound tied
Containment 2
Niantic
Acid Barge

This differs from the ranking as originally weighted only in the formation of numerous tie ranks and the movement of the Niantic Site from 7th position to 8th. East Hole moved from slightly below the Munitions Site to a tie with it.

Finally, the influence of ignoring the monitored relative containment at New London was investigated. Two approaches were taken. First, both New London and East Hole were assigned a rank of 3 for retention in the original matrix. This left the order given above unchanged, although it did reduce the margin of preference for New London. Second, both New London and East Hole were assigned a rank of 1 for retention. This moved East Hole into a tie for 2nd with

TABLE 11

Matrix Comparison: New London and East Hole

Parameter	Relative Value/ Weighting Factor	New London	East Hole
Retention	35/7	1/7	1 or 2/7 or 14
Capacity	5/1	2/2	1/1
Site Biology	10/2	1/2	1/2
Site Fishing	10/2	1/2	2/4
Area Biology	10/2	1/2	1/2
Area Fishing	10/2	1/2	2/4
Other Uses	5/1	1/1	2/2
Regulatory	10/2	1/2	2/4
Cost	5/1	1/1	2/2
Total		10/21	14 or 15/28 or 35

Containment 1, but still showed a marked preference for New London. Even inverting the Retention rankings (1 for East Hole and 3 for New London) did not move New London out of first place.

Thus, no matter which of the matrices is used, or which of the ranking systems, the relative merits of New London favor it as a disposal site when compared to East Hole or any of the other relative containment sites considered in the SEIS.

REFERENCES (continued)

282. Blumer, M., et al. 1973. Interaction Between Marine Organisms and Oil Pollution, U.S. Government Printing Office, Washington, D.C.

283. Bokuwiewicz, et al. 1974, Environmental Consequences of Dredge Spoil Disposal in Long Island Sound: Phase II; Geophysical Studies, November, 1973 - November, 1974. Department of Geology and Geophysics, Yale University, New Haven, CT.

284. Gordon, Robert B., Donald C. Rhoads, and Karl K. Turekian. 1972, The Environmental Consequences of Dredge Spoil Disposal: I The New Haven Spoil Ground and New Haven Harbor, Dept. of Geology and Geophysics, Yale University, New Haven, CT. October 1972.

285. Johanson, Edward E., Stuart P. Bowen, and George Henry. 1976. State-of-the-Art Survey and Evaluation of Open-water Dredged Material Placement Methodology, DMRP Contract Report D-76-3, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS.

286. Keeley, J. W. and R. M. Engler. 1974. Discussion of regulatory criteria for ocean disposal of dredged materials: elutriate test rationale and implementation guidelines. U.S. Army Eng. Waterways Exp. Stn., Vicksburg, MS Misc. Pap. D-74-14. 18 p.

287. Madsen, O. S. and W. D. Grant, 1976, Sediment Transport in the Coastal Environment, Report no. 209 Ralph M. Parsons Laboratory for Water Resources and Hydrodynamics, M.I.T., Cambridge, MA.

288. Maryland Department of Natural Resources. 1975. Peer Review of the Hart-Miller Islands and Alternatives for Dredged Material Disposal. Annapolis, MD.

289. Maugh, Thomas H. 1975. "Chemical Pollution: Polychlorinated Biphenyls Still a Threat." Science. 19 December 1975.

290. Mills, E. 1967. "The Biology of an Ampeliscid Amphipod Crustacean Sibling Species Pair." J. Fish. Res. Bd. Can. 24: 305-355.

291. Mills, E. 1969. "The Community Concept In Marine Zoology, with Comments on Continua and Instability In Some Marine Communities: A Review", J. Fish. Res. Bd. Can., 26: 1415-1428.

292. National Resource Planning Board, Land Committee. 1941. Land Classification in the United States; Report of the Committee to the National Resource Planning Board. USGPO, Washington, D.C.

293. NMFS 1976. Data Processing Branch. 1975 New York Data March 9, 1976. Conversion of Monthly Landings Data to General Canvass Catch Data. NMFS Office of Statistics and Market News, Patchoque, L.I., NY.

294. NMFS 1976. Summary of Microconstituents in Fishery Products Resource Survey. Final Data Report. 7/19/76, NMFS Southeast Resources Utilization Center College Park, MD.

295. New York Department of Environmental Conservation, Division of Pure Water. 1975. PCB Monitoring in the Upper Hudson River Basin. Albany, NY. 31 October 1975.

296. Phelps, D. K. 1967. "Partitioning of the stable elements Fe, Zn, Sc, and Sm within the benthic community, Anasco Bay, Puerto Rico." Proc. Int. Symp. Radioecol. Concent. Process., 1966, Stockholm 721-734.

297. Pratt, S. D. and T. P. O'Connor. 1973. Burial of dredge spoil in Long Island Sound. Mar. Sci. Exp. Stn., Grad. Sch. Oceanogr., Univ. Rhode Island, for Normandeau Assoc., Inc., Manchester, NH 37 p.

298. Pringle, B. H., D. E. Hissong, E. L. Katz and S. T. Mulawka. 1968. "Trace metal accumulation by estuarine mollusks." J. Sanit. Eng. Div. Proc. Am. Soc. Civ. Eng. 94 SA 3: 455-475.

299. Pringle, B. H. (1969). "Trace Metal Accumulation By the American Eastern Oyster." 1969 Proc. Nat. Shellfish Assoc. 59:91.

300. Rhoads, Donald C. 1963. "Rates of Sedimentation Reworking by Yoldia limatula In Buzzards Bay Mas sachusetts and Long Island Sound." Jour. Sed. Pet. 33:3 pp 723-727.

301. Sanderson, M. H., et al. 1937. An Approach to Lan Use Planning: With Particular Reference to Technique and Procedure, USDA., Washington, D.C.

302. Shuster, C. N., Jr. and B. H. Pringle. 1969. "Trace metal accumulation by the American oyster, Crassostrea virginica." 1968 Proc. Nat. Shellfish Assoc. 59: 91-103.

303. Smith, F. E. 1950. The Benthos of Block Island Sound I. The Invertebrates, their Quantities and their Relation to Fishes. Yale University, New Haven, CT, Ph.D. Thesis.

304. Kinsman, B. 1965. Wind waves: Their Generation and Propagation on the Ocean Surface, Prentice-Hall, Englewood Cliffs, N.J.

305. Jonsson, I. G. 1966. Wave Boundary Layers and Friction Factors. Proceedings of the 10th Conference on Coastal Engineering p.127-143, American Society of Civil Engineers, Ann Arbor, Michigan

306. Nacci, Vito A. 1976 Unpublished. Laboratory Data on Consolidation Rates of Thames River Spoils.

307. U. S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Region. An Environmental Survey of Effects of Dredging and Spoil Disposal, New London, CT 6th Quarterly Report, Informal Report No. 107, April 1976.

BIBLIOGRAPHY OF CONTACTS

Allen, Mary. Office of General Council NOAA Washington D.C.

Baiardi, Dr. John C. Director New York Ocean Science Laboratory Mantauk, L.I., NY.

Blossom Fred. National Marine Fisheries Service, Div. of Statistics and Market News. Patchoque, L.I., NY.

Boehm, Paul. University of Rhode Island Narragansett, RI

Briggs, Phil. Fisheries Biologist, NY Dept. of Environ. Cons. Stony Brook, L.I., NY.

Calobrese, Dr. Anthony. National Marine Fisheries Service, Milfor, CT.

Carsich, Ed. NY Dept. of Environmental Conservation., Albany NY.

Cooper, Robert. Greensport, L.I., NY.

Costa, _____. Costa Seafoods, Groton, CT.

Cox, Dr. Geraldine. Raytheon Co., Portsmouth, RI.

Crestin, David. National Marine Fisheries Service, Gloucester, MA.

Curvelles, Russell. Cot Cave Marine Laboratory, Massachusetts Division of Marine Fisheries, Salem, MA

Flye, Richard. Environ. Prot. Agency Region II, New York, NY.

Freeman Bruce. Middle Atlantic Coastal Fisheries Center Sandy Hook, NJ.

Grieg, Richard. Middle Atlantic Coastal Fisheries Center, Milford, CT.

Hughes, John. Massachusetts State Lobster Hatchery, Marthas Vineyard, MA.

Mathieson, Arthur. Jackson Estuarine Laboratory, Univ. of New Hampshire, Durham, NH.

McCall, Gerald. Massachusetts Dept. of Environmental Quality Engineering, Boston, MA.

McGrath, Richard. Boston Edison Co., Boston.

Morrisey, Thomas, National Marine Fisheries Service, Plymouth, MA.

Mt. Pleasant, Russell. New York State Department of Environmental Protection, Albany, NY.

Parsky, J. National Marine Fisheries Service, Gloucester, MA.

Paterson, R. United States Department of The Interior.

Payne, Robert, Environmental Protection Agency, Narragansett, RI.

Reufro, William. Northeast Utilities Co., Hartford, CT.

Ronk, Richard. Food and Drug Administration, Washington, D.C.

Schoning, Robert W. (Office ofc) Director, National Marine Fisheries Service, Washington, D.C.

Schwalm, Darrell. Food and Drug Administration, Wakefield, MA.

Seagran, Harry. National Marine Fisheries Service, College Park, Maryland.

Sidwell, Dr. Virginia. National Marine Fisheries Service College Park, MD.

Smith, Bruce. New Hampshire Power and Light Co., Manchester, NH.

Somers, Dr. Michael. University of Bridgeport, Bridgeport, CT.

Taber, Robert, Marine Advisory Service, Univ. of Rhode Island, Narragansett, RI.

Thomas, James C., Dept. of Marine Resources Fisheries R Research Station, West Boothbay Harbor, ME.

Thompson, B. G. National Marine Fisheries Service, Statistics and Market News, Washington, D.C.

Uzmann, Joseph., National Marine Fisheries Service Woods Hole, MA.

Wong, Ed. Environmental Protection Agency, Region I, Lexington, MA.

V. RESPONSES TO COMMENTS

Comments, either orally at the public meetings or in letter or statement form, were received from the agencies and individuals indicated below. Underlined dates indicate that the letter response was addressed to the Navy. All remaining letter responses were submitted to the Army Corps of Engineers.

Date	Agency / Individual	Response No.
30 April 1976	NOTICE OF AVAILABILITY, FEDERAL REGISTER	
<u>18 May 1976</u>	Commander, Third Coast Guard District	1.0
<u>26 May 1976</u>	Southeastern Connecticut Regional Planning Agency	2.0
26 May 1976	Chamber of Commerce, Southeastern Connecticut	3.0
27 May 1976	Robert K. Vibert, Jr., Resident, Quaker Hill, Connecticut	4.0
<u>27 May 1976</u>	*United States Department of Agriculture*, Forest Service, Northeastern Region	5.0
27 May 1976	Navy League of the United States	6.0
<u>2 June 1976</u>	General Dynamics, Electric Boat Division	7.0
<u>8 June 1976</u>	City of New London, Connecticut	8.0
	City Planning Board	9.0
	Development Coordinator	10.0
8 June 1976	Naval Electronics Laboratory Center	10.0a
<u>9 June 1976</u>	The City of Groton, Connecticut	11.0
<u>9 June 1976</u>	PUBLIC MEETING, SOUTHOLD, NEW YORK	
	Aaron B. Donner, Aide to Congressman Otis Pike	12.0
	State of New York	13.0
	New York State Department of Environmental Conservation	14.0

		Response No.
	Town of Southold, New York	15.0
	Ltr. dtd. 9 June 1976 (Exhibit 5)	16.0
	Long Island Fisherman's Association	17.0
	League of Women Voters of Riverhead-Southold	
	Statement provided (Exhibit 6)	18.0
	North Fork Audubon Society	
	Ltr. dtd. 9 June 1976 (Exhibit 7)	19.0
	Charles D. Hardy, Resident, Southold, New York	
	Statement provided (Exhibit 8)	20.0
	Questions	21.0
	North Fork Environmental Council, Inc.	
	Ltr. dtd. 9 June 1976 (Exhibit 9)	22.0
	Fishers Island Civic Association	23.0
	Jean H. Tiedke, Resident, Southold, New York	24.0
	Law Offices of Butzel and Kass	25.0
	Long Island Sound Task Force	26.0
10 June 1976	Environmental Protection Agency, Region I	NC
10 June 1976	PUBLIC MEETING, GROTON, CONNECTICUT	
	Senator Richard Schneller, Connecticut, 20th District	
	Statement provided (Exhibit 5)	27.0
	Connecticut Department of Environmental Protection	
	Statement provided (Exhibit 6)	28.0
	Representative Patricia T. Hendel, Connecticut, 40th District	29.0

		Response No.
	Betty Chapman, Resident, Groton, Connecticut	
	Statement provided (Exhibit 7)	30.0
	Groton Conservation Commission	
	Ltr. dtd. 10 June 1976 (Exhibit 8)	31.0
	City of Groton Conservation Commission	32.0
	Fishers Island Civic Association	
	Statement provided (Exhibit 10)	33.0
	Chamber of Commerce of Southeastern Connecticut	
	Statement provided (Exhibit 11)	34.0
	Republican Town Committee, Groton; Republican City Committee, Groton	35.0
	Kenneth Chapman, Resident, Groton, Connecticut	
	Statement provided (Exhibit 12)	36.0
	Larry L. Vanderhorst, Resident, Mystic, Connecticut	37.0
	Sierra Club	38.0
	Law Offices of Butzel and Kass	39.0
	Electric Boat Division of General Dynamics Corporation	40.0
	Nicola Nagle, Resident, New London, Connecticut	41.0
	Ken Wattrass, Resident, Groton, Connecticut	42.0
	H.M. Weiss, Resident, Groton, Connecticut	43.0
14 June 1976	F.B. Buchanan, Navy League of the United States; Chamber of Commerce of Southeastern Connecticut	44.0
14 June 1976	United States Department of the Interior, Fish and Wildlife Service	NC
14 June 1976	R. Fromer, Resident, New London, Connecticut	45.0

		Response No.
14 June 1976	ORIGINAL COMMENT PERIOD CLOSES	
15 June 1976	Pfizer Chemicals Division, Groton Plant	46.0
15 June 1976	Edward A. Zuraw, Resident, Ledyard, Connecticut	47.0
15 June 1976	United States Senate, Committee on Government Operations	48.0
16 June 1976	League of Women Voters of Riverhead-Southold	49.0
16 June 1976	Point Judith Fishermen,s Cooperative Association, Inc.	50.0
16 June 1976	The Southern New England Fishermen's Association, Inc.	51.0
22 June 1976	Fishers Island Civic Association, Inc.	NC
23 June 1976	Department of Natural Resources, State of Rhode Island and Providence Plantations	52.0
25 June 1976	United States Department of the Interior, Northeast Region	53.0
30 June 1976	Department of Environmental Conservation, State of New York	54.0
30 June 1976	Law Offices of Butzel and Kass	55.0
	Affidavit of Dr. Frank Bohlen	56.0
	Affidavit of Dr. Howard Weiss	57.0
	Testimony of Dr. Frank Bohlen	58.0
1 July 1976	W.F. Bohlen, University of Connecticut, Marine Sciences Institute	59.0
1 July 1976	Law Offices of Butzel and Kass	60.0
1 July 1976	Department of Environmental Protection, State of Connecticut	61.0
2 July 1976	United States Environmental Protection Agency, Region I	62.0
2 July 1976	EXTENDED COMMENT PERIOD CLOSES	

		Response No.
6 July 1976	State Historic Preservation Officer, Connecticut	63.0
7 July 1976	Advisory Council on Historic Preservation	64.0
9 July 1976	United States Department of the Interior, Fish and Wildlife Service, New England Area Office	65.0
13 July 1976	Department of Health, Education and Welfare, Region I	66.0
13 July 1976	United States Department of the Interior, Fish and Wildlife Service, New England Area Office Ltr. dtd. 9 April 1974	67.0
15 July 1976	United States Department of Commerce	68.0
22 July 1976	Advisory Council on Historic Preservation	69.0
30 July 1976	United States Department of Commerce	70.0

1.0 U.S. DEPARTMENT OF TRANSPORTATION, THIRD COAST GUARD DISTRICT

1.1 Comment:

Our only comment is to point out to you that we have, on 9 April 1976, withdrawn our application for Corps of Engineers dredge permit for the 190,000 cubic yards project at Thames River Shipyard. This should affect your table 5-1 and Paragraph 5.18. We now anticipate dredging about FY-1980 approximately.

1.1 Response:

The comment is noted. This reduces the volume of spoil to be dredged concurrently with Navy Phase II efforts by 190,000 cubic yards.

2.0 SOUTHEASTERN CONNECTICUT REGIONAL PLANNING AGENCY

2.1 Comment:

The Committee voted to maintain its original position, which supported the dredging project, and which stressed the importance of choosing an environmentally acceptable disposal site.

The Committee notes that the discussion of the alternative dumping sites considered as well as the evaluation of those sites as presented in the Supplement to the EIS indicate that the New London Dumping Ground is the preferred dumping location.

2.1 Response:

The comment is noted.

3.0 SOUTHEASTERN CONNECTICUT CHAMBER OF COMMERCE

3.1 Comment:

The Chamber of Commerce of Southeastern Connecticut would like to go on record that it is in total support of the planned program of dredging the Thames River to the vicinity of the U.S. Naval Submarine Base, New London, and that it is in support of the disposal of dredge spoils at the "New London Dumping Ground."

3.1 Response:

The comment is noted.

4.0 ROBERT K. VIBERT, JR., CITIZEN, QUAKER HILL, CONNECTICUT

4.1 Comment:

I wish to go on record in support of the proposed resumption of dredging on its merits. I believe the Navy has fairly and adequately studied this matter and it should go forward without delay.

In addition, it is vitally important to the area's economy to maintain the channel in the Thames to avoid losing any part of the Submarine Base.

4.1 Response:

The comment is noted.

5.0 <u>U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE</u>

5.1 <u>Comment:</u>

We have reviewed the above Draft Supplement and consider direct and indirect effects on vegetation to be minimal since spoil is to be dumped at sea.

5.1 <u>Response:</u>

The comment is noted.

6.0 <u>NAVY LEAGUE OF THE UNITED STATES - EASTERN CONNECTICUT COUNCIL</u>

6.1 <u>Comment:</u>

At the meeting of our Board of Directors on Friday, May 21st, we received a comprehensive briefing from one of our own members on the supplemental Environmental Impact Study pertaining to the Thames River dredging project and the proposed disposal of spoil at the New London Dumping Ground in Long Island Sound.

Our Directors voted unanimously to support the proposed resumption of dredging on its merits, and I submit the enclosed resolution for your consideration in evaluating this proposal.

6.1 <u>Response:</u>

The Comment is noted.

7.0 GENERAL DYNAMICS, ELECTRIC BOAT DIVISION

7.1 Comment:

A minor modification in emphasis concerning the potential for use of the "Hempstead Farms" area as a disposal site (Sections 6.38, 6.39 and 6.51) may be in order. C.E. Maguire, Inc. in their "Dredge and Disposal Study" (Supplemental FEIS reference 40) has indicated the possibility of the creation of a new 324,000 c.y. disposal area at Hempstead Farms. Although this is a theoretically acceptable site, Electric Boat Division has not considered it to be practicable for several reasons:

a. The site is contiguous to a designated inland wetland in the Town of Waterford and a major engineering and construction effort would be required to guarantee that no impact would occur due to seepage from the disposal area into the wetland. At this time we cannot predict the success of this engineering.

b. During the aquisition of COE permit CT-LOND-75-23 which ultimately authorized disposal of 7500 c.y. of dredged material within the dike at Hempstead Farms, both Connecticut DEP and Town of Waterford resisted development of new disposal sites adjacent to the inland wetland and specifically insisted that disposal be made only at the existing disposal site.

c. The Hempstead Farms site has been zoned for industrial use. Development of additional spoils area on prime waterfront land seriously jeopardizes the intended site use and radically reduces the property value of total 220 acre site. This economic loss has not been evaluated in the C.E. Maguire study.

7.1 Response:

The comment is noted. This new information further magnifies the unacceptability of the Hempstead Farms Site as a viable alternative to ocean disposal.

8.0 <u>CITY OF NEW LONDON, CONNECTICUT</u>

8.1 <u>Comment:</u>

Please also be advised that at the June 7 meeting of the Council of the City of New London the Council went on record as having no objection to the dumping of spoils in the same location as last year with regard to part 1 of your program.

8.1 <u>Response:</u>

The comment is noted.

9.0 NEW LONDON CITY PLANNING BOARD

9.1 Comment:

The Planning Board, at its regular meeting on May 13, 1976, voted unanimously (4 to 0) that, based upon the plans and information available at this time, no cause for objection is found.

9.1 Response:

The comment is noted.

10.0 NEW LONDON CITY DEVELOPMENT COORDINATOR

10.1 Comment:

In response to your communication and the notice of public hearing concerning the completion of the dredging of the Thames River, I think the City should go on record in support of this activity. Past fears as to the enviromental damage that would be caused by this project and in particular the use of the New London dumping ground has not materialized during the first phase of the project. From all monitoring activities of the project by the various governmental and scientific agencies, no serious enviromental problems have been identified. In light of this intense scrutiny of the first phase of this dredging operation and the importance of the Navy community in the Southeastern Connecticut economy, the City should endorse the project in order to expedite its early implementation.

10.1 Response:

The comment is noted.

10.0a NAVAL ELECTRONICS LABORATORY CENTER

10.1a Comment:

The work-load of the FORACS IV Range located on Fishers Island, New York has increased approximately 25% in the last year and is expected to be operating at this increased level for the next several years. Any increased traffic thru this area would be detrimental to on-range testing from 2 aspects: (1) vessel safety, since approximately 50% of the ships on-range are submarines operating submerged or at periscope depth and (2) acoustic interference from vessel traffic.

Our position, as stated previously is unchanged in that selection of either the East or West Holes as a dumpsite would have an adverse impact on the operations of FORACS and we therefore oppose selection of these alternate disposal sites.

10.1a Response:

The comments are noted.

11.0 CITY OF GROTON, CONNECTICUT

11.1 Comment:

At the regular meeting of the Mayor and Council held June 7, 1976, it was voted:

> "That the Council go on record supporting the U.S. Navy's dredging of approximately 2,800,000 cubic yards of material from the Thames River and subsequent spoil disposal at the New London Dumping Ground in Long Island Sound."

11.1 Response:

The comment is noted.

139

12.0 AARON B. DONNER, AIDE TO CONGRESSMAN OTIS PIKE

12.1 Comment:

We also read an earlier report from the Navy which preceeded that,that they like Rhode Island Sound, and that they thought that was the ideal place to dump the stuff in the Thames River. However, probably somebody from Rhode Island complained about it being dumped in Rhode Island Sound and we ended up back here (Greenport, P. 59).

12.1 Response:

An addendum to the RDEIS (copy of which follows) was submitted to the Council on Environmental Quality and interested parties in early August of 1973 detailing the considerations leading to the inclusion and selection of the New London Site over the Rhode Island Sound Site, This reconsideration was based on a lifting of the proscription against disposal in Long Island Sound. The results of that reconsideration were presented at length in the Final EIS (December 1973).

12.2 Comment:

The only thing I am in the position to comment on is that I've listened to a lot of hearings, and I will comment that this had the aspect of a self-fulfilling prophecy. I watch the charts carefully. I try to follow the waiting procedure as carefully as I could, but somehow or other, and I guess I'm just cynical, I knew that the New London site was going to win every single time. I just knew it was going to come out first (Greenport, P. 59-60). 170

12.2 Response:

The choice of the New London Site was based on an objective analysis of all available data. This analysis points to the New London Site as the most suitable, considering both the human and natural environments.

12.3 Comment:

On behalf of the Congressmen from the First Congressional District of New York and Fishers Island being part of Suffolk County in the First million yards -- of fill within several miles of Fishers Island in

12.3 <u>Comment continued:</u>

the Sound where again by experience seems to be an area of some environmental sensitivity (Greenport, P. 60-61).

12.3 <u>Response:</u>

The comment is noted.

13.0 STATE OF NEW YORK

13.1 Comment:

One of the factors stated to be of foremost importance to the Federal Agencies involved in reaching a decision on the project is the long-term retention capability of the ultimate disposal site. It's significant that as to the first phase of the dumping the draft supplement states that 95 percent of the spoils dumped at New London have stayed there, but there has been a movement of approximately 5 percent of those spoils. (Greenport, P. 62)

13.1 Response:

The bathymetry survey of the New London Dumping Ground as outlined in Appendix K is representative of one of the best available tools for monitoring changes in bathymetric profiles and spoil volumes over a given period. The bottom profiles as determined by this survey accounted for 95% of the material deposited at the site during the 1st increment of dredging and disposal. This should not be construed to imply that 5% of the spoil pile has already eroded. However, as indicated in Appendix K the 5% figure is indicative of a lack of definition in technique and is more representative of error than erosion. As presented in Table 5 of Appendix K, methods of estimating barge loads account for the greatest margin of error in the 5% range (94.6% - 99.9%). Therefore, the barge estimate used in calculating the percentage of spoil detected in this study determines the apparent accuracy or the percentage of spoil remaining. Using the barge estimate as provided by the Corps of Engineers Dredging Inspector it can be shown that approximately 99.9% of the spoil was accounted for at the time this study was conducted. This implies a margin of error of only .1%.

It is recognized, however, that errors due to instrumentation, theoretical calculation of spoil pile consolidation and barge estimates are greater than 0.1% and more realistically, within the 5% range.

Therefore, based on the data presented in Appendix K, and the methods employed, it is shown that at least 95% of the spoil deposited at the New London Dumping Ground during Increment I dredging operations was detected by this survey method. Any statement regarding the extent of erosion as concerns the 5% margin of error as discussed above is speculative in nature and not related to the observed data.

Paragraph 5.50 in the SEIS has been amended in light of this misunderstanding.

13.2 Comment:

Re: Monitoring reports at New London; it has always been acknowledged in the scientific community that these would be of somewhat limited value, and that it might be some time before the actual movement of spoils could be detected. (Greenport, P. 63)

13.2 Response:

The monitoring criteria for the Navy efforts at New London were established by the U.S. Army Corps of Engineers in consultation with the Interagency Scientific Advisory Subcommittee on Ocean Dredging and Spoiling (ISASODS). ISASODS also reviewed the monitoring program set up to satisfy those criteria. The thrust of the monitoring program has been to detect any short-term effects of the disposal operation and to monitor the material carefully for signs of significant movement. Active disposal at the New London Site ceased in early June of 1975, over 14 months ago. As part of the ongoing monitoring effort, bathymetric measurements have been made periodically since that time. The bathymetric charts obtained during this monitoring period are presented in Section IV of this volume. These charts indicate that neither the position nor the shape of the pile has changed appreciably over the past winter or after the passing of Hurricane Belle. Thus, it would seem that the monitoring program is suitable for detecting effects, and that no significant movement has been observed in the 17 months since disposal ceased.

13.3 Comment:

So to in this case NEPA requires full disclosure of all the relevant data in the possession of the responsible Federal Agencies. The failure of the responsible Federal Agencies in this case to issue the 5th, 6th, 7th and 8th quarterly reports of the environmental survey of the dredging and disposal impacts may very well constitute a violation of the strictly construed and enforced NEPA mandate to fully disclose all relevant data.

The very last of these reports was due last month. The sixth was due in February. (Greenport, P. 64)

13.3 Response:

The 5th quarterly abstract was part of Appendix B in the Supplement The 5th and 6th quarterly reports in their entirety were distributed to this commenting agency on January 23, 1976 and June 20, 1976 respectively as well as to other cognizant agencies. The 7th quarterly report is now being printed and will be distributed to cognizant agencies in the near future.

Since the first four quarterly reports are complementary to Vol. I and are representative of a data period exemplifying dredging and

13.3 Response continued:

disposal, these documents were bound and submitted as Vol. III. All quarterly reports are the result of an intense monitoring effort designed around permit criteria as set forth in U.S. Army Corps of Engineers Permit #CT-LOND-74-63. Although it may not be possible to detect long range impacts, these reports monitor short term effects as outlined in the permit and do not contain long term conclusory statements. The 8th and last quarterly report in the series to be submitted to the Navy by the contractors, the National Marine Fisheries Service, will be the final report and cover the contract period July 1974 to July 1976.

The term "final report" is only a contract term indicating the last report of the contract period. As stated in Paragraph 1.08 of the SEIS. " . . . It is the Navy's intention to continue a monitoring survey at the dredge site; the New London Dumping Ground or any other disposal site, so designated by the U.S. Army Corps of Engineers to receive the remainder of Navy Project spoil material."

The due dates for quarterly reports as set forth in Table 1-1 of the SEIS mandates a recommended schedule for the contractor (MACFC) to submit their reports to the Navy for review. The Navy considers the distribution of these reports to be in the public interest and in that regard makes every effort to effect public distribution of these documents without unnecessary delay.

Provisions have been made by the Navy to further distribute these documents through the National Technical Information Service. The necessary order information is presented in Table 1-1 and Paragraph 1.05 of the SEIS. Also see response 14.1.

13.4 Comment:

These reports are supposed to assess the movement of spoils at New London during the turbulent winter months. Apparently in February of this year the area experienced some storm activity that might well have affected the retention of the spoils in the area.

It is impossible for the public and for the state scientific staff to meaningfully comment on the Draft Supplement if they are not fully informed of the most recent monitoring data which admittedly may be more indicative of the future impacts of this spoil disposal than that data previously acquired. (Greenport, P. 65)

13.4 Response:

These data are contained in the most recent monitoring reports and have been provided to the New York Department of Environmental conservation and other cognizant agencies for review. As presented in Section IV, bathymetric charts for the New London Site from both before and after storm activity in February and August 1976, show that there was no change in location or measurable change in configuration of the pile. The extent of erosion, if any, is addressed in Section IV.

14.0 NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

14.1 Comment:

In general, the report presents a much more comprehensive environmental data base for decision making than its predecessors. This data base suffers only one major shortcoming. The 5th, 6th and 7th quarterly reports of the monitoring program, due November '75, February '76 and May '76 respectively, and all reports on the baselines studies of East Hole should have been included in Volume 3.

14.1 Response:

See Response 13.3 as concerns the availability of the Quarterly Monitoring Reports.

The Final Report of biological studies at the East Hole was not received until June 23, 1976. This report is included herein in Appendix N. Nevertheless the Navy did have access to a "Preliminary Report" (Ref. 226) and to a "Second Progress Report" (Ref. 227), during the preparation of the Draft Supplement. Reference to the "Second Progress Report" can be found in paragraph 6.289 of the Draft Supplement.

Results of physical oceanographic studies conducted at East Hole are also included here in Appendix N. This report (Ref. 140) dated October 10, 1975 is referenced in paragraphs 3.58, 3.61 and 6.287 of the Supplement.

14.2 Comment:

This Department believes that long-term planning for dredged material management must include full and detailed consideration of alternatives to aquatic disposal. In this regard, we find that the report dismisses the possibility of the construction of container islands in too "offhand" a fashion. (Greenport, P. 66)

14.2 Response:

In the Draft SEIS discussion of island building it was noted that one potential site for this method of spoil disposal would be at Black Rock Ledge, about 0.5 miles southwest of Avery Point near the mouth of the Thames. The potential capacity of the site was described as follows:

> Preliminary calculations suggest that a total of approximately one million cubic yards of spoil material might be accommodated at the site. This would require initial preparations including the erection of a steel pile containment structure, extending to above the waterline, approximately 1.5 miles in perimeter, and the deposition of between 60,000 and 100,000 cubic yards of rip-rap material. Rip-rap would be placed on both sides of the piles.

14.2 Response continued:

The capacity of an artificial island at Black Rock Ledge was recalculated to insure that no error had been made in the preliminary estimate. First, the Black Rock Ledge Area, as defined by the 18 foot MSL depth contour on NOAA Ocean Survey Chart #13212 (New London Harbor), was traced on graph paper and the surface area estimated by the "dot-grid" method; this yielded a surface area of 355,000 square yards. Next, the portion of the chart showing Black Rock Ledge was placed in a Map-o-graph Instrument and projected at an enlarged scale of one inch to 250 yards. The projected image was carefully traced, permitting reproduction of the boundary perimter (18 foot depth contour) and interior contours of 12 and 6 feet depths as well.

The total area within the perimeter was found to be 353,750 square yards which was rounded off to 354,000 square yards for subsequent calculations. (The calculated area was in excellent agreement with the first estimate of 355,000 square yards obtained by the dot grid method.) The average depth within the perimeter was calculated as just under 12 feet. This gave a total theoretical volume of 1,386,000 cubic yards, from which the volume of the retention dike had to be subtracted.

The length of the perimeter was carefully measured by vernier map wheel. It was found to be 2900 yards or 1.65 miles, which is somewhat greater than the preliminary estimate reported in the Draft SEIS. The perimeter of the inner edge of a containment dike 20.8 yards wide was also measured and found to be 2750 yards or 1.56 miles. The volume of theoretical capacity lost because of placement of the containment dike was also calculated and found to be 264,000 cubic yards. Subtracting this from the total theoretical capacity yields 1,122,000 cubic yards to be filled with spoil. In practice, the capacity would be considerably less than this. "Bulking" of spoil sediments characteristically leads to a capacity loss of 20% or more. In addition, the shape of the Black Rock Ledge as defined by the 18 foot contour is irregular, resembling an amoeba. In constructing a dike within the perimeter, engineering requirements would dictate some smoothing of these irregularities, with a resultant diminution of site capacity. Taking these two factors into account, it would appear that the realistic spoil capacity of the Black Rock Ledge artificial island would be less than 1,000,000 cubic yards. This confirms the original rough estimate provided in the Draft SEIS. The original estimate of required rip-rap material for the containment dike was, however, in error. The revised calculations show that this would be on the order of 176,000 cubic yards which is considerably in excess of the 60,000 to 100,000 cubic yards given in the Draft SEIS. This would, of course, add to the costs of island construction.

The above exemplary calculations assume filling to above the high water line only; in other words, a low lying island would be created. However, it would be possible to dispose of more material by filling to a height

14.2 Response continued:

of up to 20 feet above mean low water. To accomplish this would require a much larger containment dike, of course. If the Black Rock Ledge site were to be filled to a depth of 13 yards, which would bring the contained material to a level of about 20 feet above MLW, the site could accommodate about 2,700,000 cubic yards of spoil, or almost all of the Navy's Phase 2 dredging. The volume of the required containment dike would be about 790,000 cubic yards of rock fill. The surface area of the artificial island would be about 64 acres.

A special study of island building for the LISS project suggests that the cost for building an island of this size range is on the order of \$120,000 per acre, or in this case \$7,680,000. However, the curves from which this cost was derived assumed a more regular geometry than the site in question, assumed a cost of rock fill at \$10 per cubic yard, and assumed spoil in place at \$1.00 per cubic yard. (The costs were 1970-72 averages). None of these assumptions holds in this case.

The latest construction cost index published by the R.S. Means Company (1 January 1976) shows that a multiplier of 1.5 must be taken into acount for rises in rock fill prices. Thus, the cost of the containment dike alone would be \$11,850,000. Disposition of the spoil inside the dike would also cost greatly in excess of \$1.00 per cubic yard. Since the site is much closer to the shore than the New London dumping ground and well within the estuary, direct dump from a scow would not be desirable even for the initial spoiling operations and would, of course, be completely impossible once the pile began to approach the surface. The realistic options for filling the containment area are two: remobilization and hydraulic pumping of the material into the island; transfer from barge to island by clamshell dredge. Analysis of comparative costs for a number of disposal options prepared by C.E. Maguire Inc. for Electric Boat suggests that hydraulic pumping of spoil from a scow adds about \$2.50 per cubic yard to the basic costs of dredging and transport. The clamshell transfer method adds an increment of about \$5.50 per cubic yard. For 2,700,000 cubic yards of Navy spoil, the added cost would thus be about \$6,750,000 for the pumping method and about \$14,850,000 for the clamshell method. Thus, construction of an artificial island at Black Rock Ledge to accommodate the Phase 2 spoil would add from \$18,600,000 to \$26,700,000 to the basic cost for dredging, transport, and disposal at the New London site. This amounts to an additional cost per cubic yard of from \$6.89 to \$9.89.

In spite of the severe cost penalty, the clamshell transfer method is probably to be preferred on purely environmental grounds. While care would be necessary to avoid spilling into the water outside the containment dike, this method would pose little hazard of sedimentation or introduction of polluted material into the sensitive near-shore estuarine waters. The hydraulic method would create more severe difficulties. The material inside of the dike would have to be dewatered, raising the real possibility of pumping fine materials in suspension into

14.2 Response continued:

adjacent waters. In addition, it might be noted that the LISS study estimates that annual maintenance costs for an artificial island run to about 0.5% of the initial construction cost. For the example cited here this would range from about $90,000 to $130,000 per year.

In general, it would appear that construction of an artificial island for spoil containment is feasible only in areas of shallow water (20 feet depth or less), where the bottom material represents a good load bearing surface, where direct transfer from hydraulic dredge at the site to the containment area is possible. Such sites are not abundant. Neither the State of Connecticut DEP not the LISS found candidate sites in the New London area. The only site this study could find which seemed at all feasible was that discussed above. The extreme cost disadvantages previously described appear to rule it out of active consideration, especially since there remains a potential environmental hazard associated with the barge-to-containment-area transfer.

Several other factors are worthy of at least noting. The Corps of Engineers in a Draft Environmental Statement for its proposed dredging of New London Harbor (12 June 1972) considered island creation. Speaking of the sediments of the lower Thames, which tend to have a larger grain size than Navy Phase 2 spoil, the Statement noted: "Construction of artificial islands depends primarily on the nature of the spoil material (e.g. grain, size, cohesiveness). Much of the dredged material would not be suitable for such use and separation would be difficult. Disposal of the unwanted material would have to be made." Construction of the island, especially the containment dikes, would be a lengthy process; a proposal for construction of an island of about 123 acres in Holland discussed in the Long Island Sound Study memorandum on artificial islands estimated that the task would take up to three years. Artificial islands appear to be practicable only when they are accomplished at a large scale where the costs of the containment dike do not loom so large as for smaller projects. Examples of proposed projects that meet this criterion would be an artificial island in Baltimore Harbor to contain 100,000,000 cubic yards of spoil or an 11,000 acre impoundment near Staten Island in lower New York Bay. Neither the necessary quantities of spoil nor suitable sites for projects of similiar magnitude appear to be available in Long Island Sound.

14.3 Comment:

Moreover, in dismissing the use of land base disposal sites, the report forecloses one extemely important disposal option. Although the identified sites lack the holding capacity for all of the Navy's dredged materials, certain of the sites could be used for disposal of only the most highly contaminated sediments such as those from various areas and upper strata. (Greenport, P. 66)

14.3 Response:

As stated in paragraph 6.54 of the SEIS, a land disposal capacity of less than 1,400,000 cubic yards exists in the project area. This capacity would accommodate less than half of the Navy's immediate needs. The high cost of land disposal and administrative delays incurred by lengthly land procurement procedures and associated engineering problems do not coincide with the imminent need to accommodate the operational capability of the 688 Class Submarines.

Environmentally, the chemical equilibrium and solubility of chemical constituents in land disposed saline sediments can be expected to change with time especially when exposed to weathering.

Exposure to alternate periods of drying in air and soaking with rain-water will facilitate mobility of these once stable chemical factors into ground water systems. For these reasons land disposal of these dredged materials is not desirable.

Finally, considerations of dredge site and disposal site turbidity indicated that clamshell dredging should be used for this project. This method does not allow for the selected removal of thin layers of surface sediment for separate disposal; the "bite" of the clamshell is about three feet in depth.

14.4 Comment:

Such disposal efforts, (on land) however, must not damage tidal wetlands and must be so designed as to prevent significant contamination of Thames River's waters from spoil area runoff.

14.4 Response:

No land disposal is proposed, so these problems will not arise.

14.5 Comment:

While we find much of the narrative descriptions of ocean disposal sites to be complete and accurate, we find that the matrix analysis used to compare the sites is often biased, non-objective and incomplete.

14.5 Response:

The matrix method chosen for this analysis is considered to reflect the real importance of natural resources accurately; human use categories together were only given a weighting of 30%, while environmental factors, including fishing, were given 70% of the weight.

14.6 Comment:

The Navy's conclusion that New London is the best containment site is evidentally based on a comparison of monitoring observations at New London with physical data from other sites. Clearly this is comparing apples and oranges. When one compares bottom sediment, grain size, tidal currents, and wave induced currents, the New London site is clearly inferior to East Hole and containment sites 1 and 2. Moreover, there is limited evidence to date that the spoil site at New London is spreading to the northwest and southeast. The 6th and 7th quarterly monitoring reports, including winter and spring data for 1975, may establish whether such spreading is occuring. (Greenport, P. 67)

14.6 Response:

The spoil pile at New London is elongated in a northwest-to-southeast direction because the disposal buoy was moved early in 1975 to prevent excessive buildup of the pile at one point. Bathymetry results from as late as August 1976 (see Section IV) do not show any measurable changes in the shape or location of the spoil pile even after Hurricane Belle.

14.7 Comment:

Biological factors in dump site selection have not considered a very significant issue. Since estuarine productivity is generally much higher than that of offshore areas, and since human use and consumption of estuarine harvested resources is similarly higher near shore sites such as New London and containment site 1, should be regarded as more susceptible to long-term impacts of exposure to toxic components of dredged spoil than the offshore sites such as East Hole. (Greenport, P. 67-68)

14.7 Response:

The weighting process, described in paragraph 6.410 of the SEIS, considered biological factors as very significant in the site selection process. "Biology" and "Fishing" together accounted for 35% of the total weighting given to the seven parameters. Additionally, a detailed comparison of the biologic resources at New London and East Hole, given in Section IV of this volume, points out that the primary productivity of the two areas is approximately equal and that human use and consumption of fish and shellfish is higher at East Hole than at New London. Finally, susceptibility to impacts is predicated on material movement; no such movement has been observed at New London. Physically, the two sites offer similar potentials for retention of Thames River sediments, but, as pointed out in Section IV, the materials placed at New London have undergone no significant movement, even under the influence of winter storms or Hurricane Belle in August of 1976.

15.0 TOWN OF SOUTHOLD, NEW YORK

15.1 Comment:

I know there is a project that has to be accomplished and rightfully so. I would suggest that further study be given for other alternatives, and that the permit at this time, as it is temporarily suspended, stay that way. I wouldn't say revoke. I wouldn't go that far, but I would like to see further studies and other areas explored. (Greenport, P. 70)

15.1 Response:

The comment is noted.

16.0 TOWN OF SOUTHOLD, NEW YORK

16.1 Comment:

The Town of Southold wishes to reaffirm their opposition to the placing of spoil from this project in Long Island Sound particularly in the Fishers Island area.

The Town feels that a land disposal site or offshore dumping area would be a better alternative, and more in keeping with the best interest of the public.

16.1 Response:

The comment is noted. See Response 14.3 and site comparisons set forth in Section 6, Volume I, of this Supplement.

17.0 LONG ISLAND FISHERMAN's ASSOCIATION

17.1 Comment:

On behalf of the Long Island Fisherman's Association I've sat here this evening and heard a great deal of information, but I haven't heard anywhere they have shown an improvement in the dumping area as far as the fishermen are concerned, mainly, the marine life in the area. The Long Island Fishermen are -- of course it is on record from previous hearings -- against disposal of spoil in both Long Island Sound and Block Island Sound. (Greenport, P. 71-72)

17.1 Response:

The comment is noted.

18.0 THE LEAGUE OF WOMEN VOTERS OF RIVERHEAD - SOUTHOLD

18.1 Comment:

On page 68 the heading of paragraph 3.57 refers to the New London site as "A proposed ocean disposal site." Yet, on page 307, paragraph 6.408 refers to the New London site as an inland water.

18.1 Response:

The term "proposed ocean disposal site" as used on page 68 of the SEIS is a convenient short-hand for all of the disposal sites considered. In this context, the term implies disposal in saline waters, as opposed to disposal in fresh waters or on land. The description of the New London Site which follows the paragraph heading makes it clear that the site is located within 2.5 miles of the mouth of the Thames River, and not many miles at sea. The reference in paragraph 6.408 of the SEIS is to waters in which the Inland Rules of the Road govern shipping, not to inland waters in the sense of rivers or lakes. The New London Site can also be characterized as being in "Navigable Waters", since the Corps of Engineers Navigable Water Rules govern the disposal of dredge material there. Thus, in different contexts, the New London Site can meaningfully be called an ocean site, an inland water site, and a navigable water site.

18.2 Comment:

The use of the phrase, "Historic dumping grounds", with reference to the New London site, assumes that once an area is used for dumping (which in this case 1943 is the earliest date) its indefinite use for this purpose is acceptable.

18.2 Response:

No such assumption of acceptability is implied in relating the historical use of the New London Site. Its history as a spoil disposal site is important in assessing its present characterisitics and in assessing its suitability under disposal regulations. Both the EPA (40 CFR 230.5) and the Corps of Engineers (33 CFR 209.120) indicate that existing disposal sites may be more acceptable than new sites (see Response 61.17). This in no way forces the choice of an existing site, but it does necessitate an accurate description of past disposal activities at a site which is under consideration for dredge material disposal under the regulations of either agency.

18.3 Comment:

What will be the interaction or synergistic effect between for example, any of the heavy metals and chemicals or cobalt-60 from the submarine base, the latter having a half-life of 5.2 years?

18.3 Response:

Because of the extreme insolubility and low concentrations of the cobalt 60 in the sediments to be dredged, there will be no significant effect either direct or additive or synergistic with the other constituents of the sediment. The Nuclear Regulatory Commission has also considered the question of synergistic effects between chemical pollutants and low levels of radioactivity (ref. AEC Docket 50-412 dated April 25, 1974) for a similar situation and concluded "...at the radiation levels projected..., there will be neither synergistic, nor additivity, or potentiating effects between the radioactive releases and other pollutants in the environment."

18.4 Comment:

What will be the cumulative effect of the radioactivity in the sediment plus the radionuclides emitted from Millstone nuclear power plants 1 and 2 plus Shoreham and Jamesport if they go into operation?

18.4 Response:

The concentrations and amounts of cobalt 60 radioactivity in the sediment to be dredged are small and do not have a significant effect on the environment. As indicated in the Draft Supplement, the cobalt 60 radioactivity is in the form of insoluble metal oxides which are not assimilated in the food chain. Therefore the cobalt 60 in the sediment would not make any significant contribution to population exposure and would not contribute to a postulated cumulative effect from the referenced power stations.

18.5 Comment:

Barbara Ward, the noted British economist and author writes, "Inland seas can lose much of their dissolved oxygen if excessive waste disposal stimulates the growth and then the death of oxygen-absorbing algae. One of the profound problems posed by nature's 'thresholds' is that the approach to the point of no return may give few if any danger signals. Red lights do not flash on in the deeps as one more species of whose role in the total ecosystem we are completely ignorant heads for death. We do not even know what we are losing. Even if we did, it would be too late."

18.5 Response:

The best direct measure of the potential for excessive stimulation of algae is the algal assay. Dr. S.Y. Feng, of the University of Connecticut, has conducted algal assays using elutriates obtained from Thames River sediments and Thames River water. These results, as reported in the 1st Quarterly Monitoring Report, did not correlate

18.5 Response continued:

with chemical analyses of the elutriate nutrients. Had correlation taken place, (negative or positive) either total inhibition of photosynthesis would have resulted, or a tremendous bloom of phytoplankton would have been found. Chlorophyl (a) has been found to be slightly higher than background at the dredge barge but to return to background levels within 250 yards from the site. While light and dark bottle tests did not indicate the elutriate would inhibit photosynthesis, on one occasion lower levels of Chlorophyl (a) were found near the dredge barge. This would indicate that any release of nutrients to the water column was minimal and did not induce increased or reduced phytoplankton productivity. If productivity were to increase, one would expect it to be more pronounced within the riverine system due to higher nutrient levels than either the New London site or East Hole site. Therefore, while the elutriate analyses indicate large quantities of nutrients, the actual and realized biological potential for even moderate changes in primary productivity is very low. While sediment nutrient concentrations have been higher in and near the spoils, no significant changes in nutrients have been found in the area being monitored.

Finally, direct measurements of dissolved oxygen have been made at the disposal site during disposal operations (4th Quarterly Monitoring Report). These show no change in dissolved oxygen following a disposal event. Thus, there is no data available that would suggest either direct or indirect reductions in oxygen levels at the New London Site.

18.6 Comment:

Paragraph A-17 states, "It is anticipated that pollutants, including creosote, resulting from pier removal and possible blasting will be sufficiently diluted by the river action." We consider pollution by dilution unacceptable whether the pollutants enter the air or the water, just as use of air or water as a heat sink is unacceptable.

18.6 Response:

This observation was made simply to indicate that although close control will be exercised over pier removal operations, some release of materials cannot be avoided. No case is made for "pollution by dilution."

18.7 Comment:

Figure 6-8, opposite page 194, of the SEIS, depicts shellfish beds and refers to Bay Ocean Quahaugs and Bay Sea Scallops, again a strange dichotomy of designation for crustaceans of inland waters.

18.7 Response:

A dash should have been placed between "bay" and "ocean quahaug", as well as between "bay" and "sea scallop". The designated areas for these shellfish were combined for graphic simplicity due to the map scale. However, bay quahaugs, ocean quahaugs, sea scallops and bay scallops belong to the taxonomic category of Mollusca, and not Crustacea.

18.8 Comment:

Page 17 of the 4th Quarterly Report, dated August, 1975; the paragraph concludes, "results of the recent survey will be presented in a forecoming annual report which will be submitted in lieu of this quarter's report." Does this mean that further studies are still to be carried out?

18.8 Response:

The report alluded to a summary of the first year's studies, which was presented in the 5th Quarterly Monitoring Report (See Response 13.3).

18.9 Comment:

On page 117 we find an ambiguity in the sentence which reads, "Although the extent of environmental effects of dumping contaminated dredge spoils in the marine environment are still unknown, recent research efforts have shown that "concerns regarding the release of toxic materials into solution phase during dredging operations and disposal are mostly unfounded.""

18.9 Response:

The sentence has been corrected in the SEIS to read as follows:

"Although the extent of long term environmental effects of dumping contaminated dredged material into the marine environment is not known, recent research has shown that the short-term effects as 'concerns the release of toxic materials into solution phase during dredging operations and disposal are mostly unfounded' (ref. 274)".

18.10 Comment:

This Supplement has assessed the various disposal sites from the primary consideration of transport cost.

18.10 Response:

Cost was not a prime determinant in most of the disposal site evaluations. Where costs proved to be extremely high, as for most land disposal sites and for artificial island construction, they were taken into consideration. With respect to open water disposal, cost was rated at only 5% in the evaluation. The sensitivity analysis displayed in Table 6-11 shows that elimination of cost did not affect the ranking.

18.11 Comment:

At least 20 lobstermen are in the Fishers Island area. Each tide produces approximately 100 pounds of lobsters at approximately $4,000 per man. What is the cost to the people who depend on the fishing industry for their livelihood, and to the towns where they live?

18.11 Response:

Disposal of dredge material at New London might have a beneficial effect on the local lobster fishery. Lobster catches may increase because the mound of material provides greater habitat than is now available. Disposal at East Hole might either disrupt over-wintering lobsters, or have no effect; there are no firm data on the presence or number of over-wintering lobsters, although it is possible that they use East Hole.

The NMFS reports that during 1975, 186,400 pounds of lobster, valued at $386,290.00, were caught in Long Island Sound and landed in Suffolk County. Due to the nature of the reporting statistics, the catch in Long Island Sound landed at Suffolk County is as close as the data will allow to the value of the lobster fishery on the Race and Fishers Island area. A representative from the New York Department of Environmental Conservation of Stony Brook, reports New York lobster landings for the entire of Long Island during 1975 to be valued at $474,000.00 (average prive of $2.09 per pound to the boat). It was also indicated that approximately one-third of the $474,000.00 was caught in the Race-Fishers Island area. This would result in an approximate value of New York landings from this area of $158,000.00 to the boat.

Lobster landing and value data for 1975 is now available from Connecticut. The landing and value data for fishing areas 1 and 6 (which correspond to the Race, Plum Island, Fishers Island, and the Connecticut coast from Old Saybrook to Stonington and Rhode Island), indicate 1975 landings of 241,680 pounds at a value of $471,171.00.

A summation of the New York and Connecticut data of the area gives a value of approximaterly $629,171.00. Assuming the lobstermen do not factually report their total catch, a conservative factor of 50% puts the boat value of the lobster fishery at $1,258,342.

19.0 NORTH FORK AUDUBON SOCIETY

19.1 Comment:

In their initial summary they say, "Removal of polluted sediments from the Thames River would serve to enhance the commercial fishery by increasing the productivity of the estuary." If it can improve the river to remove the polluted sludge, how can they believe that dropping that sludge will fail to harm the living Sound?

19.1 Response:

The anticipated improvement to productivity in the Thames River estuary is based on the observation that the deeper sediments contain lesser concentrations of various pollutants and will, when exposed by dredging, provide a more suitable habitat for finfish spawning than is now available. (Paragraph 5.10 of the SEIS).

It is also pointed out (in paragraph 5.38 of the SEIS) that this benefit may be had at the risk of possible adverse effects at the disposal site. The monitoring efforts to date have not revealed such effects, and the development of a sufficient data base to determine the consequences of the long-term effects is underway.

The effects of dredged material disposal must be considered separately from the effects of sludge disposal. The materials to be disposed of are not sewage sludge and the effects seen in sludge disposal areas cannot be ascribed to their disposal.

19.2 Comment:

Thames River spoil cannot be considered for beach nourishment because of the fine size and the polluted nature of the sediments, nor for sanitary landfill, nor even for strip mine reclamation.

19.2 Response:

Beach nourishment, as noted in paragraph 6.13 of the SEIS requires clean, sand-sized spoils. The material dredged from the Thames River, or any other comparable harbor situation, would not be suitable for this use. The grain size of the material is much too small and its organic matter content is much too great. Thus, Thames material is "polluted" in terms of the requirements of beach nourishment materials.

The difficulty with using Thames sediments for landfill cover is also based on their physical and chemical properties. The materials are low in strength, so that distributing them over the surface of a landfill would be difficult. Additionally, they contain many sorbed contaminants which, although stable in saline water, might be subject

19.2 Response continued:

to leaching when they are alternately dried and rewet with fresh water, as would happen in a landfill cover.

Some of these same considerations would operate if the material were used for strip mine reclamation. This, however, was not the reason for eliminating this alternative from consideration; as paragraph 6.15 of the SEIS points out, there are not strip mines within a reasonable distance of New London.

None of these three examples speak in any fashion to the likely effects of marine disposal of the dredged material. These effects have been the subject of an extensive monitoring effort (reported in Volume Three) which has shown no short-term adverse effects except for temporary elimination of the benthic community at the disposal site; it is now recovering.

19.3 Comment:

They did not deal with Cofferdam islands to contain the spoil, as some of us earlier suggested.

19.3 Response:

The general problems associated with artificial island construction have been discussed under 14.2 above. However, the use of steel containment walls, as opposed to rock dikes, seems to be the subject of this comment. The problems are, if anything, worse than for the dike case. In a Draft Environmental Statement "Fall River Harbor; Massachusettes and Rhode Island" of 29 October 1971, the Corps of Engineers considered the erection of a double wall steel sheet pile container in shallow water in Mount Hope Bay. This container, with a radius of about 500 yards, was to provide capacity for accepting project dredge spoil (4,000,000 cubic yards) plus maintenance dredging for the next 40-50 years. This suggests a total capacity of about 5,200,000 cubic yards in a container rising seven feet above mean sea level. Total depth of the containment vessel would have been about 20 feet. The cost of construction was estimated at from $12 to $15 million.

A similar container to accept Phase II spoils would have a radius of about 418 yards, providing an excess capacity of 840,000 cubic yards to accommodate other projects. The cost, taking into account the reduced perimeter and also inflation-induced increases in construction costs, would be about $17,000,000. If one tailored the container to match the Navy's Phase 2 disposal needs, the radius of the containment vessel would be reduced to about 367 yards, and the cost would be about $15,000,000. Both estimates exceed those for the rip-rap dike case discussed earlier. The cost of transfer from barge to containment vessel would be similar to those discussed above.

19.3 Response continued:

The Fall River proposal contemplated hydraulic dredging and transfer of highly polluted material. One of the advantage cited in favor of the containment vessel approach was that it would retain polluted materials in the area from which they had been taken. This suggests that pollutant effects from transfer and dewatering operations were not a serious difficulty. This would not be the case in the New London area. The container method requires access to shallow, protected waters, and these are the very waters which have been cited as of such biological value and sensitivity as to require special protection. (Navigational requirements would appear to rule out a site in the Thames itself.) The resulting "island" would protrude from the near shore bottom like an immense submerged tin can and would hardly represent an addition to the aesthetics of the area in which it was placed.

Finally, the container could be expected to deteriorate with time, giving rise to an entire new suite of environmental difficulties; and such a structure might present a navigation hazard, especially at New London, where the only even remotely suitable site is hard by the navigation channel at the mouth of the Thames River.

19.4 Comment:

When the original Army permit was issued, the Navy had asked permission to dump 2.8 million cubic yards of spoil at the site over a period. Now they are planning, paragraph 5.25, to dump about that 5.3 or 5.4 million cubic yards at the site, not all of it Navy.

19.4 Response:

The original Navy project involved 2.8 million cubic yards of material to be dredged in two phases. Phase I required the removal of 1.5 million cubic yards of material from the entrance of the Thames River to the Gold Star Memorial Bridge. The Phase II effort involves 1.3 million cubic yards of material from just north of the bridge to the NAVSUBASE. In addition, new programmed and unprogrammed Navy dredging totaling 1.5 million cubic yards are reported on in the SEIS (paragraphs 2.04 to 2.08), bringing the Phase II total to 2.8 million cubic yards. This is the only material for which a permit is being sought by the Navy. The remainder of the 5.4 million cubic yards referred to in paragraph 5.25 of the SEIS is to be dredged by the Corps of Engineers and several private parties, as described in paragraphs 5.15 through 5.24. These non-Navy projects constitute separate permit actions, but were included in total disposal estimates to allow an accurate determination of quantities of material that might be directed to the New London Dumping Ground.

19.5 Comment:

In short, the Navy seems to be saying that because New London has been a dumping ground for 40 years (with the Sound deteriorating every year) and there's no other convenient place to put this mess, we're stuck with it.

19.5 Response:

See Response 18.2

19.6 Comment:

We urge the Corps to refuse to reinstate this permit, and to remember that not only they but the EPA, paragraph 4.11, have a distinct legal obligation to protect us from unacceptable adverse effects on shellfish beds and fishery areas; effects on submerged vegetation; effects on food chains and species diversity; effects on the movement of fauna; and degradation of aesthetic, recreational and economic values, in this case far more than the estimated $10 million worth of these values.

19.6 Response:

The Comment is noted.

20.0 CHARLES D. HARDY, RESIDENT, TOWN OF SOUTHOLD, NEW YORK

20.1 Comment:

The principal investigator of the prime contractor of the study, the National Marine Fisheries Service, Sandy Hook Laboratory, is also Chairman of the Interagency Scientific Advisory Subcommittee on Ocean Dredging and Spoiling. This committee was established to make recommendations to the Corps of Engineers of acceptable dredge spoil dumping areas, and also to make recommendations to the nature and extent of the sampling and monitoring to be carried out.

Under such an incestuous closed loop system under the guise of objectivity, the pressures for human bias are enormous. The design implementation and conduct of acceptable scientific investigations requires peer review from outside the system.

20.1 Response:

The Quarterly monitoring reports for the Navy disposal at New London have been distributed to Federal, State, local, university, and private scientists for review and comment. Many of these reviewers are from "outside the system".

The design and implementation of the monitoring effort was under the direction of the ISASODS panel, which included representatives of the National Marine Fisheries Service the Corps of Engineers, the U.S. Geological Survey, the U.S. Fish and Wildlife Service and the Environmental Protection Agency. This group collectively designed the program. Selection of contractors to carry out the monitoring effort was based on the qualifications of the available groups. That one member of the contracting team should also be a member of the ISASODS panel points to the qualifications of the Middle Atlantic Coastal Fisheries Center in the area of marine research, not to an "incestuous closed loop".

20.2 Comment:

In all the data submitted to date, the Navy has failed to establish that the New London Dump Site is a containment site, "On the basis of clearly stated data and reasoning", as ordered by the U.S. Court of Appeal. In fact, what little and inadequate data of currents supplied by the Navy, indicate that the New London Dump Site is dispersive.

20.2 Response:

The Court of Appeals did not order the Navy to establish that the New London Dump Site is a containment site. The statement of that Court, which is reiterated in the Order issued by the District Court, was as follows: "The supplemental statement must then make a genuine effort in a truly objective fashion to evaluate and compare the qualities of all of the containment sites and to select one on the basis of clearly stated data and reasoning." This Supplement satisfies the foregoing

20.2 Response continued:

statement. The relative containment characteristics and risks of environmental damage relating to disposal at the New London site and all the other disposal sites considered have been evaluated, and a comparison and the choice of a proposed site have been made on an objective and rational basis which has been fully disclosed herein.

20.3 Comment:

The Navy, using data and conclusions of an alleged and unpublished report by Morton, et al, 1975, claimed that a bottom velocity of 1.72 feet per second is necessary to erode the dredge spoils characterizing the Thames River.

20.3 Response:

The report of Morton, et al. is unpublished. To facilitate further review of this SEIS, that report has been attached as Appendix N. Page 43 of that report indicates that "Measurements at the Massachusetts Maritime Academy in a flume tank have shown that for dredge spoil taken from the Thames River, a mean velocity of approximately 52.5 cm/sec (1.72 ft. per second) at a height of 15.25 cm (6 inches) above the bottom (half the height of the flume tank) was sufficient to cause significant erosion and transport of material." In addition, the work of Morton, et al. includes direct measurements of boundary layer turbulence at the New London Site. These results (page 49 of Morton, et al.) show "that the spoils deposited at the Dump Site are comparatively stable and very little erosion should occur due to current flow."

20.4 Comment:

The Navy did not include the alleged current meter data collected by Morton, et al, at the New London Dump Site in their Final or Supplement Impact Statement. The Navy did not base their conclusions that the New London Dump Site was a containment area on Morton, et al, study, while at the same time ignoring data that was supplied in the Impact Statement.

20.4 Response:

The Morton, et al. report has been attached to the SEIS as Appendix N. Much of the data used in the SEIS discussion of New London (paragraph 3.61) was taken from their work. These data were complimentary to the other data collected on the site. The conclusion on the retention ability of the New London Site was based on all the data available. Further discussion of this determination is presented above in Section IV of this volume.

20.5 Comment:

Bottom current velocities of 1-1/2 to 2 knots were reported by subcontractors to the study (University of Connecticut scuba divers), which is equivalent to 2.5 to 3.4 feet per second. This exceeds the critical velocity necessary for erosion and dispersal of dredged spoils as determined by the Navy's own consultants.

20.5 Response:

The notation of current velocities (First Quarterly Report, November 1974, page 14) was made by MACFC personnel. Mr. Robert Reid of MACFC has subsequently indicated that the currents of 1.5 to 2 knots were estimated, not measured velocities. Mr. Lance Stewart of the University of Connecticut has also reported he has not experienced difficulty with the currents and estimates them to be 1.0 to 1.5 knots. Constraints on diving time (First Quarterly Report, November 1974, page 13) were not attributable to currents, but to necessity of performing other tasks (Reid, pers. comm.).

20.6 Comment:

Current meter records show that maximum current speeds of 56 to 61 centimeters per second were observed, which are equivalent to 1.8 to 2 feet per second. Such speed again exceed the critical erosive velocity.

20.6 Response:

In comparing velocities, several terms must be defined and the height above the bottom at which measurements are made should be specified. The critical erosion velocity of Thames River sediments is 52.5 cm/sec (1.72 ft/sec) measured at 15.25 cm (6 inches) from the bottom. The current meter readings of 56 to 61 cm/sec (1.8 to 2.0 ft/sec) were made with current meters moored about one meter (3.28 feet) from the bottom. At a height of one meter, a velocity of 71 cm/sec (2.33 ft/sec) is necessary to produce a velocity of 52.5 cm/sec at 15 cm from the bottom. Thus, the current meter results from one meter off the bottom are less than the erosion velocity at one meter off the bottom.

20.7 Comment:

It must be pointed out that both the scuba observations and the current meter data were all observed during optimum sea conditions. Measurements of current speed at the dump site, under adverse wind and wave conditions have never been measured by the Navy or its consultants.

20.7 Response:

The biological dive studies reported in the Fifth Quarterly Monitoring Report (pages 23 through 25) were conducted on the 22nd and 23rd of October, 1975, three days after a northeaster of three days duration. The divers reported "No disruption of the spoil pile or its fauna by this storm was apparent." Additionally, bathymetric surveys discussed in response 13.2 above provide spoil pile measurements before and after the winter storm season (1975-76). These show that no major movements or changes in shape occurred in the pile over the winter (Additional measurements made after hurricane Belle in August 1976 also showed no major disturbance of the material). Finally, a detailed reconsideration of storm wave phenomena is given in Section IV of this volume. This demonstrates that waves which can be expected at New London are generally insufficient to cause erosion of the material.

20.8 Comment:

The embarrassingly small and limited current meter measurements revealed by the Navy clearly indicate that erosive velocities do exist at the New London Dump Site. Failure of the Navy to note this in the Final Environmental Impact Statement Supplement is a direct affront to the ruling of the Court of Appeals that the Navy select a site "on the basis of clearly stated data and reasoning."

20.8 Response:

The current meter measurements presented in the six Quarterly Monitoring Reports can hardly be called "embarrassingly small and limited." Arrays of three meters were installed at the site on eleven separate days from August 1974 to December 1975. These have resulted in over 175 hours of record. These meters were moored near the waters surface, at mid depth, and one meter (3.28 feet) from the bottom. As noted in response 20.6 above, a velocity of 71 cm/sec (2.33 ft/sec) is necessary at one meter from the bottom to produce a velocity of 52.5 cm/sec (1.72 ft/sec) at 15 cm (6 inches) from the bottom. In the 175 hours of results taken from data gathered at the site, the maximum velocity measured one meter from the bottom was 61.1 cm/sec (2.00 ft/sec), well less than the 71 cm/sec velocity needed at one meter from the bottom to induce erosion.

In addition to these data in the Quarterly Monitoring Reports, current measurements at New London were also made by Morton, et al. and are reported in Appendix N. Results were obtained from 3-meter arrays placed at New London between December 10, 1974 and February 4, 1975 and again between August 6 and September 2, 1975. These records, covering over 80 days of results, revealed a maximum velocity of 59 cm/sec (1.94 ft/sec), measured at 1.5 meters (4.92 feet from the bottom. A velocity of 74 cm/sec (2.44 ft/sec) is necessary at this elevation to produce a velocity of 52.5 cm/sec (1.72 ft/sec) at 15 cm from the bottom. Once again, no measurement exceeds that velocity required to cause erosion.

20.9 Comment:

Due to the polluted nature of the spoil, it will take some time before burrowing marine organisms begin to break up the spoil deposit. The period of the monitoring survey was much too short for the combined action of increasing biological activity in concert with the high maximum current speeds to sweep these polluted spoils westward into Long Island Sound.

20.9 Response:

Marine organisms have already begun to colonize the material at the New London Site. In fact, as of the Sixth Quarterly Monitoring Report, species diversity on the pile was approximately representative of surronding areas. As discussed in Section III of this volume, this colonization is likely to stabilize the surface of the material, rather than to mobilize it. The monitoring effort, discussed in response 13.2 above, shows no major change in the shape or location of the pile. It does not appear likely that these materials will sweep into Long Island Sound. However, should the materials move, they may be deposited in the center of Long Island Sound at a vaery slow rate.

20.10 Comment:

The Navy would do better to consider locations which offer environmental characteristics more fitting to the designation of containment. Such locations appear to exist in Rhode Island and Block Island Sound, and southeast of Block Island.

20.10 Response:

The specific sites to which this comment refers are not identified. Thus, no full response is possible. If, however, the sites referred to are the Rhode Island Sound Site and East Hole, neither of these sites appear to offer any significant advantage over New London in terms of containment.

20.11 Comment:

There is a rumor among the scientific community that these spoils have moved, and this may or may not appear in the forthcoming quarterly reports. Thank you.

20.11 Response:

As noted in Section IV, bathymetry measurements taken in May and August 1976 failed to disclose any major movement of the spoil pile even after a major storm system such as Hurricane Belle. to cause erosion.

21.0 CHARLES D. HARDY, RESIDENT, SOUTHOLD, NEW YORK

21.1 Comment:

In the May 1973 Draft Environmental Impact Statement, your consultant Jason Cortell, I believe, categorized New London Dump site as a dispersive area and he left it and advised the Navy to choose the Rhode Island Sound Dump Site, I think also called Brenton Reef; yet, seven months later in the December 1973 Final Environmental Impact Statement the recommended Rhode Island Sound Dump Site was masked out and the New London Dump Site was put in using the same data base. Could you explain? This is rather -- it has always been a mystery to me. (Greenport, P. 110-111)

21.1 Response:

The Revised Draft Environmental Impact Statement (May 1973) considered a total of six possible disposal sites for the spoils from the Thames River dredging. The choice of the candidate sites was an outgrowth of comments received on the Draft EIS, supplemented by investigations into the physical, chemical, and biological properties of Block Island Sound and Rhode Island Sound. Particularly important were the comments received from the U.S. EPA, who stated:

> "We recommend that the material be disposed outside of the Long Island Sound, as recommended by the Long Island Sound Enforcement Conference of 1971. A detailed environmental analysis should be done on alternative disposal sites."

This statement and the Conference Proceedings to which it referred were taken as a proscription against spoil disposal in Long Island Sound, which precluded consideration of the New London Dumping Ground for disposal of the Navy spoil. Thus, the search for a suitable dump site was directed eastward into Block Island Sound and Rhode Island Sound. In this search for potentially suitable disposal sites, data were gathered on tidal currents, bottom sediments, and spoiling history.

The results of this effort, which did not even include the New London Site (much less assign it a dispersal designation), indicated that the Rhode Island Sound Site was the most suitable of the sites then available for consideration.

As concerns the Navy's consideration of the New London Dumping Ground vice the Rhode Island Sound Dump Site, see Response 12.1.

22.0 NORTH FORK ENVIRONMENTAL COUNCIL, INC.

22.1 Comment:

We wonder how effective the re-evaluation of data will be following the completion of the NAVSUBASE dredging. It is far too simple to use the same dump site rather than to dump selectively, or choose alternative means to spoil disposal. This re-evaluation becomes particularly important in the light of current studies on dumping management by the Marine Resources Research Center group under Dr. Schubel as SUNYSB.

22.1 Response:

As indicated in the Contact List Dr. Schubel was one of the many researchers contacted during the preparation of this Supplement. The concept of monitoring as concerns the disposal of spoils at the New London Dumping Ground is mandated by criteria set forth in U.S. Army Corps of Engineers Permit #CT-LOND-74.63. Competent scientists from both Federal and State organizations, whose sphere of expertise includes the fields of Marine Biology, Oceanography, Ocean Engineering and Sedimentology are active in the Navy's monitoring program and are responsible for collecting, evaluating and re-evaluating their own data on a quarterly basis. Quarterly reports are prepared for each quarter of monitoring throughout the contract period.

The Quarterly reports are reviewed by the Interagency Scientific Advisory Subcommittee on Ocean Dredging and Spoiling (ISASODS) and the Corps of Engineers to insure that all parameters measured comply with the permit criteria. The scope of the Navy monitoring program employs state-of-the-art techniques whenever possible, and constitutes a comprehensive scientific investigation of the problems associated with dredge spoil disposal. As stated in Paragraph 1.08 of the SEIS, "...It is the Navy's intention to continue a monitoring survey at the dredging site, the New London Dumping Ground or any other disposal site, so designated by the U.S. Army Corps of Engineers to receive the remainder of Navy project spoil material."

22.2 Comment:

Clearly, the need for oil spillage corrections and sewage disposal improvements are indicated at the Base and on the Thames overall. Is there sufficient impetus to carry these programs out or will we have to accept delays and foot-dragging and more polluted spoils to handle?

22.2 Response:

Military Construction Project P-303, rescheduled for 1979, has been prepared and submitted for approval. This project will correct all deficiencies in the underground fuel oil distribution systems. The Project

22.2 Response continued:

also includes provisions for construction of containment dikes around diesel fuel tanks and loading stations. Construction of a wash rack, a storage area for oil spill cleanup equipment, and an oil-water separator are provided.

Projects recently completed or now underway will eventually provide for the conveyance of ship generated sewage to the Town of Groton's waste treatment facility (Appendix A, page 12). These projects should be completed by the end of 1976.

22.3 Comment:

We are dismayed by the fact that there is still no bi-state organization with clear-cut jurisdiction to deal with a problem such as this.

22.3 Response:

The comment is noted.

22.4 Comment:

We object to the spirit with which ocean dumping is simply accepted and alternative means are dismissed on economic grounds.

22.4 Response:

Economic factors (i.e. excessive cost to the taxpayer) were considered in the evaluation of alternatives to open water dumping disposal. However, they were not necessarily dominant. There are simply not suitable places available for land disposal to accommodate Navy Phase 2 dredging. For example, the estimates in the Supplement have been revised downward in the light of a communication from Electric Boat Division (see Comment 7.0) informing the Navy that its Hempstead Farm site will not be available for spoil disposal by anyone because of environmental and zoning considerations. Cofferdam containers and artificial islands have been analyzed further in Response 14.2. The economic penalty associated with these disposal methods appear to be such as to multiply disposal costs per cubic yard by factors of from three to ten times. None of the alternatives is without associated environmental problems, and in some cases detailed analysis might show these to be worse in fact than the postulated but speculative impacts of open water dumping.

22.5 Comment:

3.32 - What plans are now in effect to abate oil pollution originating from the NAVSUBASE?

22.5 Response:

Response 22.2 describes Navy plans for abating oil spillage at the Base.

22.6 Comment:

3.36 - Have any changes in PCB levels been detected recently? These ought to be monitored carefully in the light of recent events on the Hudson. What are detactions limits? 500-700 ppb doesn't seem all that low for PCB levels?

22.6 Response:

The recent incidents involving PCBs on the Hudson River involve the effects from very high levels of industrially-released PCBs in fresh-water sediments above the dam at Troy, New York. The results as discussed in Section III of this Volume are not indicative of the possible influences of the more moderate PCB levels observed in Thames River sediments.

The observed concentration of PCB (10-11 ppm) at two pier locations are high as compared to channel sediments in the lower Thames River which contains concentrations on the order of 0.5 ppm. Channel sediments sampled by the State of Connecticut several miles north of the NAVSUBASE were observed to contain PCB concentrations on the order of 0.2 ppm (See Appendix H).

Values for PCB concentrations in sediments are usually reported in the ppm range rather than the ppb range. Therefore, PCB concentrations in Navy dredge materials were reported from channel sediments as 0.5 - 0.7 ppm rather than 500-700 ppb. The actual detection limits within this range depends on the chemical configuration of the compound to be identified. As of the date of this impact statement, no standards for PCB's have been recommended by regulatory agencies as concerns acceptable concentrations for PCBs in sediments. Although surface sediment samples collected from two areas exhibited concentrations as high as 11 ppm there are no existing regulations which would suggest that these concentrations are unacceptably high. In addition, these concentrations are local in nature and are not representative of PCB concentrations in the majority of Navy project dredge materials.

The overall signficance of specific concentrations as they relate to the long-term cummulative effects within food webs has yet to be determined. Therefore, PCB levels are not being monitored for changes in concentrations at this time.

22.7 <u>Comment:</u>

3.38 - What improved methods are proposed for fuel and waste handling and transfer?

22.7 <u>Response:</u>

See Response 22.2.

22.8 <u>Comment:</u>

3.39 - and 3.45 - Sections indicate problems from shipboard wastes. What steps will be taken? Have ship-to-shore connections been completed?

22.8 <u>Response:</u>

See Response 22.2.

22.9 <u>Comment:</u>

3.46 - This section quotes "extreme adverse environmental conditions existing in the river sediments". One certainly has doubts about long-term and large scale dumping on that basis.

22.9 <u>Response:</u>

The quote in question only describes the conditions of the sediments as they have limited the growth of benthic organisms at specific sampling stations at the Naval Submarine Base (SEIS figure 3-1). The quote does not apply to the majority of sediments to be removed from the Thames River through 1985.

22.10 <u>Comment:</u>

3.64 - What are the margins for error in the spoil pile calculation? It sounds simplistic for a thirty foot spoil layer to remain motionless. Diffusion of soluble contaminants away from the site could be a problem over a long time period, e.g. (3.54) sea water samples with the order of 100 ppb Pb concentration were found in elutriate analyses.

22.10 <u>Response:</u>

See Response 13.1 for a discussion of spoil pile calculation accuracy. Appendix J presents a detailed evaluation of the problems associated with lead analyses. Section III of this Volume discusses long-term effects of disposal operations.

22.11 Comment:

4.15 - This section and following sections describe the problems of jurisdiction. A Bi-State Organization should be empowered to deal with the dredging operation.

22.11 Response:

The comment is noted.

22.12 Comment:

5.10 - Could the dredging schedule be curtailed to allow for winter flounder spawning (approximately mid-March to the end of April)?

22.12 Response:

Winter flounder are permanent residents of Long Island Sound, and generally breed in shallow New England waters (6-20 ft) between the months of January and May.

As stated in paragraph 5.02 of the SEIS the Navy monitoring studies have shown that the suspended sediment concentrations are undetectable 150 meters down stream from a working dredge. Mobile species of fish, such as winter flounder can avoid these sediment plumes which are generally controlled by currents in the deeper channel areas and still effectively spawn in the more shallow areas of the river.

In the short-term, the spawning of winter flounder will be affected to some degree during the dredging operation but as stated in paragraph 5.61 "The cleaning of the lower portions of the river by the removal of polluted sediments may improve habitat and serve to promote spawning of desirable species of finfish."

Therefore, to meet the operational schedules of the 688 Class Submarines, it is essential that the dredging be completed without further delay. An additional 5 month delay to alleviate localized impacts on the spawning of winter flounder in the Thames River could have a serious effect on the Nation's defense posture.

22.13 Comment:

5.15 - and 5.36 - Additional dredging projects 2.5 million cubic yards by 1985 and up to 5.3 million cubic yards mentioned as the ultimate number. What will prevent this number from growing tenfold?

22.13 Response:

A careful search of the area and numerous interviews with water-side businesses and government agencies was conducted to derive the estimates presented in the SEIS. These estimates are felt to be as accurate as is possible for the present, but does not preclude someone from devising a project in the future.

22.14 Comment:

6.11 - thru 6.51 - These means of disposal ought to be encouraged even if costs are higher, and they should be brought into play as quickly as possible.

22.14 Response:

The comment is noted.

22.15 Comment:

11.06- The conclusion seems to blithely accept indefinite ocean dumping "Under provisions of the Marine Protection, Research, and Sanctuaries Act." Surely that Act was not intended to encourage this process.

22.15 Response:

The Act specifies that the disposal must not impact upon Marine Sanctuaries. Thus, the provisions of the Act are essential to assessing any disposal activity. The Act is not intended to encourage ocean disposal; rather, it establishes conditions under which disposal should be reviewed and can be directed to another site. The reference to the Act in paragraph 11.06 (page 333) is in the context of establishing alternatives, not as an acceptance of indefinite ocean disposal.

23.0 FISHERS ISLAND CIVIC ASSOCIATION

23.1 Comment:

We are still gravely concerned with the concept of the New London Dump site as a containment site rather than a dispersal site. We are still gravely concerned about the spoil material to be dumped in the New London Dump site. (Greenport, P. 92)

23.1 Response:

Monitoring reports to date demonstrate that the New London Site is a good relative containment site; no movement or change in shape of the spoil pile have been detected by bathymetry surveys as late as August 1976.

24.0 JEAN H. TIEDKE, RESIDENT, SOUTHOLD, NEW YORK

24.1 Comment:

In the chart which showed ranking of the sites according to their retention ability and biological activity, et cetera, was determination of that ranking made in consideration of the polluted quality of the spoil, or would the ranking apply to the dumping of so-called clean spoil?

24.1 Response:

The entire ranking process in the SEIS was based on those site characteristics which might indicate retention of silt-sized spoils, such as those from the Thames, and on those site resources which might be affected by the chemical consituents of the dredged material. The rankings, especially in terms of retention, would have been the same for any silt-sized material. The biological site rankings depended upon the biology of the sites being considered: they would be the same for any possible material to be disposed of.

24.2 Comment:

Somewhere in this presentation spoil upgrading was mentioned as one of the possibilities of getting rid of this I assume; but I don't quite understand what this is. Could someone explain?

24.2 Response:

Spoil upgrading (discussed in paragraph 6.12 of the SEIS) is not a disposal technique. It is, rather, a group of pre-treatments (including dewatering, incineration, and oxidation) which could be used in conjunction with any disposal technique to improve the physical and chemical properties of the dredged material prior to disposal. These techniques are not now well enough developed to deal with the quantity of material to be dredged by the Navy.

24.3 Comment:

What kind of limits have been put on Dow, Electric Boat, and the SUBASE, et cetera. Are there people, previously at least, who have dumped a great many chemicals and pollutants into the river?... I wonder how many more contaminants will be continually dumped into the river as they were in the past?

24.3 Response:

Paragraph 3.13 and Appendix G of the SEIS discuss the 150 individual dischargers along the Thames River who have been subject to the requirements of the National Pollutant Discharge Elimination System. Twenty-four of these have been identified (in Appendix G) as major dischargers and many of these are under compliance schedules from the Connecticut Department of Environmental Protection to improve the quality of their effluent. The Navy, for instance, will be connecting its discharges to the Groton system by 1977. The limits on industrial discharges generally require the removal of all harmful substances from the waste stream. Many of the sources along the Thames are now at least partially treated. As shown on the attached Table, there has been some noticeable improvement in the quality of the Thames over the past five years, especially in terms of Total Kjeldahl Nitrogen (TKN), Total Phosphorous, and bacteria. These improvements may continue in the future as the remainder of the dischargers along the river begin treatment of their wastewater.

24.4 Comment:

I didn't read every page of your latest volume, but was there any table anywhere listing what radio-nuclides might be in this spoil?

24.4 Response:

Paragraphs 3.47 through 3.51 in the SEIS provide a discussion of the radiological character of the dredged material.

24.5 Comment:

Is it possible that there could be interaction with contaminants from other areas besides the Thames River spoils?

24.5 Response:

Such interactions are always possible. In the case of the New London Site, in fact, studies presented in the 4th Quarterly Monitoring Report indicated that the Thames River discharge contributed significantly to coliform bacteria levels at the disposal site.

THAMES RIVER WATER QUALITY

		EPA, 1970 from FEIS, 1973	CT Data 1974-1975	CT Data June 1974	CT Data Aug. 1975	Trend 1970-1975
Salinity	0/00	1-24	1.5-30	--	24-30	Same
pH		7.1-8.0	7.1-7.9	7.8-8.6	--	Same
Turbidity	JTU	3-5	1-8	--	--	Same
DO	mg/1	4.2-8.6	4.8-13.2	8.1-13.1	4.2-7.6	Same
BOD	mg/1	2.5-4.3	--	2.4-4.6	1.8-13.0	Up
TKN	mg/1	0.89-1.90	0.28-0.57	0.85-1.14	0.34-0.86	Down
Total P	mg/1	0.08-0.17	0.04-0.13	0.07-0.11	--	Down
TOC	mg/1	2-5	2.8-7.6	6.2-8.0	--	Up
CU	ug/1	100	0-50	100	--	Same
CR	ug/1	100	--	--	--	?
ZN	ug/1	50	0-90	100	--	Up
Pb	ug/1	300	--	--	--	?
Hg	ug/1	--	--	--	--	?
Total Col	MPN/100ml	790-24,000	--	200-1300	20-3480	Down
Fecal Col	MPN/100ml	240-24,000	--	40,200	--	Down

25.0 LAW OFFICES OF BUTZEL AND KASS

25.1 Comment:

The standard set for Impact Statements in the Second Circuit decision is full disclosure and the order of Judge Blumenfeld which affected that decision mandates a genuine effort and truly objective fashion to the preparation of the Draft Supplement. It's against these standards that the Draft Supplement must be judged, and it is under these standards that we believe the Navy has failed to comply. (Greenport, P. 98)

25.1 Response:

This Supplement discloses pertinent information as required by law, and the preparation of this Supplement, at considerable Government expense, meets the requirements set down by the Second Circuit Court of Appeals. (See also Response 20.2).

25.2 Comment:

The Navy persists in characterizing the New London Dumping Ground as a containment site and notes only minimal erosion has occurred of the dredged spoils that were dumped there in '74. This conclusion as to moving of spoils did not justify by the facts revealed in the last Supplement itself. The last Supplement indicates that 95 percent of the dumped spoils have remained at the site. The implication is that 5 percent have moved. If you extrapolate that over ten years one might assume that half the spoils will move within that period. (Greenport, P. 99)

25.2 Response:

See Response 13.1.

25.3 Comment:

Moreover, the validity of the measurements of dispersion of the New London Dumping Grounds taken by the Navy are subject to serious question. First, the measurements were taken on one day, August 13, 1975. No measurements have apparently been taken in the last 10 months. No assessment has apparently been made in the winter storm season that just passed. (Greenport, P. 99)

25.3 Response:

See Response 13.4 and Section IV of this Volume.

25.4 Comment:

Second, the Navy admits that its own August 1975 assessment of scouring or winnowing and subsequent transport from the site was "inconclusive and required further analysis." This analysis has apparently not been made.

25.4 Response:

The above statement applies to the quality and scientific value of side scan sonar records with respect to the transport of spoil material from the disposal site. Side-scan sonar was representative of an additional effort to gather data on the surface features of the spoil pile. However, the equipment could not be adjusted to provide adequate resolution of the finer features of the spoil pile surface necessary to detect winnowing and scouring. Further interpretation of these sonar records could not be made due to the quality of the record. Therefore, it was determined that the further use of side-scan sonar would not usefully supplement the bathymetry surveys already employed.

25.5 Comment:

Third, according to at least Appendix K to the Draft Supplement, even the Navy is willing to say only the transport from the site may be minimal. (Greenport, P. 100)

25.5 Response:

The comment is noted.

25.6 Comment:

Finally, and most important is our understanding that there are other additional studies that have been carried out and that is the 5th, 6th and 7th quarterly reports. These reports, we believe, should be immediately circulated to all those parties who received the Draft Supplement and a further hearing should be held to afford the public an opportunity to comment on them. (Greenport, P. 100)

25.6 Response:

See Response 13.3.

25.7 Comment:

First, the Draft Supplement cautions that fishing at the disposal site "Should be discouraged since the extent of sources of contamination in organisms frequenting disposal sites have not yet been determined." If even this short-term impact on fish is in such doubt, how can the Navy assert that there are no short-term adverse impacts. (Greenport, P. 101)

25.7 Response:

This warning represents good environmental policy. Such should not be be interpreted as an estimate of impact.

25.8 Comment:

Second, it is not clearly stated in the Draft Supplement that the spoils to be dredged in Phase II of the project is significantly more polluted than the spoil from Phase I. Whatever impacts produced by Phase II, therefore, would only be magnified with the Phase II sediments. I mean whatever impacts were produced by the Phase I sediments would only be magnified with Phase II sediments. (Greenport, P. 101)

25.8 Response:

The comparison between Phase I and Phase II materials was made at length in the FEIS and not reproduced in the SEIS.

The average values as percent dry weight of the various pollutants tested for by bulk chemical analyses were:

Parameter	Phase 1	Phase 2	Navy Piers	CG Piers	EB Piers
Volatile Solids	4.5	8.0	8.3	8.6	4.8
COD	4.7	7.44	---	20.7	8.7
Nitrogen	0.11	0.20	0.11	0.53	0.17
Oil and Grease	0.092	0.12	0.216	0.091	0.290
Mercury	0.000010	0.000004	0.000059	0.000053	0.000045
Lead	0.0036	0.0055	0.012	0.014	0.011
Zinc	0.0052	0.0039	0.019	0.016	0.032

The Phase 2 values are indeed higher than Phase 1 (calculated from Table 2 in the FEIS) values in Volatile Solids, COD, Nitrogen, Oil and Grease, and Lead. They are lower in Mercury and Zinc. Also, in general, pierside values are higher than either Phase 1 or Phase 2 values. Paragraph 3.23 has been amended to reflect this clearly. Note that the comparison of Channel to Pierside sediments is already made in Paragraphs 3.22 to 3.36, and that in general, Navy pierside sediments are lower in constituent chemical concentrations than either Coast Guard or Electric Boat pierside sediments.

Impacts of Phase I sediments are discussed in Section 3 of the FEIS. Impacts of Phase II sediments are discussed in Section 5 of the SEIS.

25.9 Comment:

Third, the Draft Supplement indicates that on-going studies on the long-term impact of dredging are "inconclusive and that such impacts will not be determined in the "near future". The public is entitled to know more about the status of these studies, the findings to date and the expected target date for completion of such studies, otherwise the public cannot determine whether it will be willing to suffer now the threat of possible, significant adverse, long-term impacts. (Greenport, P. 101,102)

25.9 Response:

The status of information on the long-term effects of dredge material disposal is presented in Section III of this volume. The status of Navy monitoring efforts at New London is discussed in Response 13.3.

25.10 Comment:

Fourth, as long as the impacts do remain unclear, short-term or long-term, logic requires that the risks be avoided to the greatest extent possible. This suggests moving away from a site like New London which is so close to spawning grounds and other recreational uses on the Connecticut Shore, Fishers Island. (Greenport, P. 102)

25.10 Response:

Sections III and IV of this volume speak at length to this question. There seems to be little chance and no evidence of such effects from previous disposal at New London.

25.11 Comment:

Now, I would like to address the comparisons between New London and other sites. The Second Circuit decision puts great stress on the need to consider alternatives adequately. While the Draft Supplement presents more data on the various alternative dump sites, the presentation of this data is misleading and inaccurate especially in the case of East Hole. (Greenport, P. 102)

25.11 Response:

The data presented in the SEIS on the East Hole Site were not inaccurate, but were misinterpreted by a number of reviewers (See Section II of this volume). In the SEIS, all 15 alternative sites were treated at the same level of detail for purposes of comparison. In Section IV of this volume, East Hole has been singled out for a very detailed discussion and a reevaluation of its merit relative to the New London Site.

25.12 Comment:

The most basic criticism of the Draft Supplement in this regard concerns sediment assessments and current measurements at various sites, and the conclusions drawn on the basis of such measurements and assessments. The Supplement relies without explanation solely on the size of the bottom sediment particles to determine the containment rating of the various sites. (Greenport, P. 103)

25.12 Response:

The Supplement, as indicated in paragraphs 6.363 through 6.370, considered both sediments and currents in determining retention rankings.

25.13 Comment:

The Draft Supplement makes an effort to describe the possible origin of such particles in some cases but not in others. Thus , for example the coarse materials found at New London is assumed to be a lag deposit and not the result of winnowing, while no effort is made to explain the origin of the sand sediment at the East Hole. But on the basis of such sediment, the East Hole is characterized as only a marginal containment site. (Greenport, P. 103)

25.13 Response:

The character of coarse deposits at New London was determined from underwater television studies and diver surveys reported in Morton, et al. That report is attached as Appendix N to the SEIS. Paragraph 3.58 of the SEIS describes the observations made at New London. These showed that the coarse deposits extended over tens of feet in length and that the boundaries with finer material were sharp; this indicated that these features were the result of barge loads of coarse spoil. Some winnowing was noted by Morton, et al., but this was a localized phenomenon which occurred only at the bases of large lumps of material, where local turbulence is higher than over smooth areas of the material.

The materials found at East Hole are natural, rather than the result of disposal and they are described in some detail in paragraphs 6.283 and 6.284 of the SEIS. The origin of materials in eastern Block Island Sound and at East Hole was considered in paragraphs 6.78 to 6.81 in the SEIS.

Further details of sediment types are given in Section IV of this volume.

25.14 Comment:

As to the current measurements, the curve measurements, the Navy compares bottom tidal currents and other currents. An important

25.14 Comment continued:

factor, of course, is bottom currents since it is at the bottom where the spoil will be sitting and subject to the waves and tide.

In terms of bottom tidal and bottom storm currents, East Hole, for that matter Containment Site 1, is clearly superior to the New London Dumping Ground. Bottom tidal velocity at East Hole is 1.22 feet per second. That comes from the Draft Supplement. While bottom velocity at New London is 1.7 feet per second, significantly higher. (Greenport, P. 103-104)

25.14 Response:

A full discussion of bottom tidal currents at the two sites is given in Section III of this volume. The 1.22 feet per second value at East Hole was the average maximum recorded. Peak values are as high as 1.9 feet per second (59 cm/sec) at East Hole.

25.15 Comment:

It should also be noted that maximal tidal, this is not storm velocities at New London, were reported by the New York Ocean Science Lab to be 2 feet per second and 1.9 feet per second on February 28, '75 and May 21, '75. These are in excess of the 1.7 feet per second erosion producing velocity which is cited by the Draft Supplement which was also noted by Mr. Hardy. Nevertheless, New London is given a higher rating than East Hole on its containment scale despite the fact on the findings of these measurements. Noteworthy too that the Draft Supplement describes a bottom current at East Hole as producing "friction velocities that are significantly less than those required to erode the spoil material." Yet, the conclusion that East Hole is only a marginal containment site stands and New London is again given a higher rating than East Hole on the containment scale in the Draft Supplement. (Greenport, P. 104-105)

25.15 Response:

East Hole and New London tidal current, storm current, and sediment data are reviewed in Section IV of this volume. The original designations of these sites is supported, even though they are physically similar, because of the monitored containment of sediments at New London.

25.16 Comment:

The Supplement also says on the basis of bottom currents that the Rhode Island site, which was called the containment site in the revised Draft EIS a few years back, can be expected to "contain these sediments much of the time." Yet, Rhode Island is given the lowest, possible retention rating on the scale. (Greenport, P. 105)

25.16 **Response:**

Evidence presented in paragraph 6.212 of the SEIS pointed out that the containment ability at the Rhode Island Sound site was open to serious question.

25.17 **Comment:**

The same criticism can be made of other criteria used by the Navy in comparison of different alternatives. For example, the Navy did not consider proximity to major recreational waters, nursery and wetland areas as a criteria. No account was taken of the fact that East Hole is further away from recreational waters, nursery areas and wetland than the New London Dumping Ground; and if the spoil were to move from the East Hole it would have further to go before causing further adverse impacts. The Draft Supplement instead considered only whatever fishing was done right at the proposed site. Thus, an already used site like New London was highly rated because dumping had already destroyed the site and little fishing remained. A site like East Hole got a lower rating though there was, according to the Supplement, only negligible fishing at the site. (Greenport, P. 105-106)

25.17 **Response:**

Section IV of this volume discusses this point fully. The biological and fisheries value of the East Hole Area still seems superior to that at New London.

25.18 **Comment:**

Furthermore, East Hole and containment site 1 are given short shrift because of alleged other uses of the dump site, yet nothing is said in the supplement about how filling up part of East Hole or containment site 1 will interfere with periodic use of the FORACS or the acoustic range. (Greenport, P. 106)

25.18 **Response:**

As discussed at length in Section IV of this volume, there are potential conflicts between disposal at East Hole and the operation of the FORACS Range. These conflicts might be eliminated by careful routing and scheduling of disposal activities.

25.19 **Comment:**

Finally, the utilization of the regulatory criterial seems completely without merit. The clear purpose of the Second Circuit requiring the

25.19 Comment continued:

Navy to consider all feasible alternative sites was to require it to generate and evaluate information on such sites. Now the Navy says that sites like East Hole or containment site 1 must rank very low under the regulatory criteria on the Navy's chart because of the "current lack of information available as to their characteristics and suitability at the disposal site and the difficulty and expense of obtaining such information." You may ask just what the Navy has been doing these last 10 months, how can it compare sites about which it lacks and fails to seek information. The program at New London was meant to assess and not to justify by its very distance further dumping at New London. (Greenport, P. 106-107)

25.19 Response:

The primary thrust of the regulatory ranking, described in paragraphs 6.403 and 6.404 of the SEIS, is the degree of regulatory interest in a site and the degree of inter-agency coordination achieved at a site. Such interest and coordination helps to insure that disposal criteria are observed carefully by providing a number of interested reviewers for any project.

In terms of site comparision, the Navy neither lacked nor failed to seek existing information. The data presented in the SEIS represented a summary of over 300 data sources and interviews with over 100 experts on the area under consideration and the problems of dredged material disposal. In addition, monitoring efforts were undertaken at both New London and East Hole. These were not to justify the use of New London, but rather to assess the disposal at New London and to determine conditions at East Hole. The results of the studies at East Hole are attached to the SEIS as Appendix N and serve as the basis for a more detailed comparison of these two sites in Section IV of this volume.

25.20 Comment:

In sum, evaluation and comparison of the various sites presented in the Draft Supplement are faulty and misleading commended pursuant to the foregoing comments it might well just demonstrate that the East Hole or some other site is superior to the New London Dumping Ground. (Greenport, P. 107)

25.20 Response:

Section IV of this volume re-evaluates East Hole and the New London Sites in light of the comments. The original site rankings contained in Section 6 of the Draft SEIS are still considered valid and the relative rankings of the New London and East Hole Sites still favors New London as a disposal site.

25.21 Comment:

First I would like to make brief note of the Navy's discussion of alternative disposal techniques. Many of these descriptions are very brief. They don't give much information from which an average reader can gather what is actually going on. For instance, the Navy notes the possibility of using the spoils in waterfront disposal for parking lots but did not follow this suggestion up in any way. (Greenport, P. 107-108)

25.21 Response:

More complete discussions of the alternatives were provided in the FEIS. Since no new information on most of them was found, no new discussion was made. New land disposal options did seem possible. These were investigated fully in the SEIS.

25.22 Comment:

It notes that island building would be really very expensive, "but gives the reader no details as to how just expensive it would be or what other sites might be available for this purpose. (Greenport, P. 108)

25.22 Response:

The full cost of island construction and the character of the only site found near New London are discussed in Response 14.2 above.

26.0 LONG ISLAND SOUND TASK FORCE

26.1 Comment:

Our chief concern with this project is with all proposed dumping in the Sound as it is only the smallest step towards a comprehensive plan for management of dredging around Long Island Sound. As long as you continue to divide the Sound into bits and pieces and to handle each project and area without regard to the rest of the Sound, you automatically close off a variety of options which might provide a much better solution to dredged spoil disposal throughout the Sound.

We urge that you undertake such a long-range assessment immediately, and that until it is completed you exercise great caution on any dumping in Long Island Sound. (Greenport, P. 109-110)

26.1 Response:

The comment has been noted.

27.0 STATE OF CONNECTICUT, 20th DISTRICT SENATOR

27.1 Comment:

Southeastern Connecticut cannot afford to take the risk that dredge spoils, dumped at the New London site, might migrate only two and one-half miles back to shore - and threaten the shoreline's fragile ecology and its dependent industries.

27.1 Response:

As pointed out in Section IV of this Volume, should material leave the New London Site, the likely transport routes are away from the Connecticut shoreline, not towards it. Thus, any threat to resources would most likely be felt to the south and east of the site, not to the north and west. Additionally, there is no physical evidence that such transport has occurred, nor that the resources of the Connecticut shoreline have been harmed by past disposal activities at New London.

27.2 Comment:

When data shows that currents are stronger and the water is shallower at the New London site and that the bottom material is finer at East Hole, then the logical conclusion is that the East Hole site makes dissipation of the dredge spoils less likely. When it is also considered that the New London Dumping Ground is located near shore, in an area where sport and commercial fishing are heavy the argument for East Hole grows stronger. East Hole is further out to sea and less populated with desirable fish, so the potential ecological damage is smaller.

27.2 Response:

Full discussion of the relative currents and sediments at New London and East Hole are given in Section IV of this volume. There seems no reason to believe that the East Hole offers better containment properties than New London. The fish population at East Hole, addressed also in Section IV, is not without value. And, sport fishing out of New London is generally focussed to the Southeast of the disposal site or at the Race, not at the Site. Thus, the potential for ecological damage may be larger at East Hole than at New London, rather than smaller.

27.3 Comment:

East Hole is an economically feasible alternative to the New London Dumping Ground. It is only 14 miles from the mouth of the Thames River - a reasonable distance to travel to dump dredge spoil, when viewed in the context of a multi-million shipbuilding program the extra cost of dumping at East Hole is nominal.

27.3 Response:

East Hole was not characterized as economically infeasible, even though there may be a 50% cost differential between the two sites. Disposal cost was weighted at only 5% in the site ranking. The sensitivity analysis of cost impact on ranking (see Table 6-11) demonstrated that cost had no effect on the site ranking judgments since the ranking remained the same when cost was eliminated from consideration entirely.

27.4 Comment:

Use of the New London Dumping Ground would also violate a fledgling State policy that DEP is now evolving with the Army Corps of Engineers. That policy encourages the exclusive use of three central dumping sites in Long Island Sound - the New London Dumping Ground is not one of the three.

27.4 Response:

Since the final approval of a disposal site will be made by the Army Corps of Engineers, the Navy is confident that evolving policy will be considered. This policy, however, has neither been finalized nor approved.

28.0 STATE OF CONNECTICUT, DEPARTMENT OF ENVIRONMENTAL PROTECTION

28.1 Comment:

We believe the Navy's development of their Thames River facilities as presented in the Supplement reflects a proper and compatable utilization of the areas resources. In addition to providing for the Navy's National Defense mission, the dredging will enhance the integrity of the Thames River estuary as one of the best multiple use ports in southern New England.

28.1 Response:

The comment is noted.

28.2 Comment:

. . . open water disposal of the sediments generated by the Navy and others described in the supplement, appears to be the only viable alternative for the bulk of the material to be dredged due to the lead time required to responsibly engineer many of the possible alternatives. Further delay is unacceptable not only to the Navy, but to the numerous other harbor development projects delayed by the controversy over the Navy's disposal to date.

28.2 Response:

The Navy and many other potential dredgers in the Thames are completely in agreement with this comment.

28.3 Comment:

Based on my Department's review of the available data presented in the supplement, we have concluded that disposal should not be resumed at the New London dumping grounds and that a new site, a point within the so called East Hole area, should be designated by the Corps of Engineers as a regional disposal site for dredged materials.

28.3 Response:

The comment is noted.

28.4 Comment:

The State of Connecticut is formulating a dredge spoil disposal policy which "can be described as somewhat restrictive for there are some types of dredged materials, which due to their polluting character should not be open water dumped. The vast bulk of the Thames River sediments are not in this category however."

28.4 Response:

The Navy has maintained since 1973 that Thames River sediments were suitable for ocean disposal.

28.5 Comment:

. . . the Department identified three general areas in Long Island Sound we believed represented environmentally compatable sites for regional disposal areas. These are located 1) in over 100 feet of water South of Norwalk, Connecticut, within the old Eatons Neck dumping ground; 2) in over 70 feet of water south of New Haven at the New Haven Dumping Grounds; and 3) in over 170 feet of water south of Long Sand Shoals and the mouth of the Connecticut River.

28.5 Response:

The comment is noted.

28.6 Comment:

Based on our review of the data presented in the Supplement and five quarterly monitoring reports and discussions with members of the academic community, we have concluded that the New London dumping grounds does not meet the standards of containment or distance from ecologically sensitive breeding, feeding and nursery grounds. Based also on the data presented in the Supplement and discussions with individuals outside this agency, we have concluded that the so called East Hole area does contain a point or points, which meet all criteria required for designation by the COE and certification by the EPA as a regional dredged material disposal site.

28.6 Response:

As noted in Comment 62.2, the U.S. EPA has no objections to either site. They consider the two sites to be quite similar. Currently, however, the East Hole is not a designated dumping site and could not be used by the Navy until such designation is achieved. Additionally, the Navy still feels that, given two similar sites, the environment is best served by using a previously spoiled site, rather than beginning spoiling at a new site. Also the analysis contained in Section IV of this volume confirms that New London is a preferable site.

28.7 Comment:

Wave induced bottom currents and water depth were evaluated under "site or containment capacity" and evidently were not introduced into the retention ability ranking. This would be all right except for the weight applied in the supplement to site capacity (5 percent) does not realistically evaluate the role of waves in the movement of bottom sediments. Wave effects are significant, especially at the New London site.

AD-A031 434 NAVAL FACILITIES ENGINEERING COMMAND PHILADELPHIA PA --ETC F/G 13/2
FINAL ENVIRONMENTAL IMPACT STATEMENT, DREDGE RIVER CHANNEL: NAV--ETC(
SEP 76

UNCLASSIFIED NL

3 OF 6
AD
A031434

28.7 Response:

Wave exposure was used in determining the original ranking of sites for retention. Further consideration of wave induced velocities have been made in Section IV of this volume. There seems to be no justification for weighting capacity at any more than 5%, since all of the sites considered will accept greater than the total amount of spoil to be dredged over the next decade.

28.8 Comment:

Measured currents at the bottom are reported to be stronger at the New London site (often in excess of 2 FPS) than at the East Hole site (max observed slightly over 1.2 FPS).

28.8 Response:

Reported currents for the East Hole Site in the SEIS were mean maximum bottom tidal velocities based on work reported in Morton et al (ref. 140) These currents are not the maximum currents measured at East Hole by the authors. Examination of figure 45 from the report entitled "East Hole Center Lower Speed Direction Plot 27 June - 6 August 1975" (see Appendix N) indicates that on several occasions bottom currents, at 1.5 meters off the bottom, were measured in excess of 50cm/sec (1.64 ft/sec) and on July 8, 1975 in excess of 56 cm/sec (1.84 ft/sec). Examination of bottom current velocity information from the East Hole site presented in figure 50 (Southeast Lower Station) indicate bottom current velocities at or above 30 cm/sec (0.98 ft/sec).

Morton et al (ref. 140) report bottom current meter results for the New London dump site for December 1974 to January 1975 and August 1975. These measurements were taken 1.5 meters off the bottom. Examination of Figure 18 (see Appendix N) indicates a maximum bottom current speed of 59 cm/sec (1.94 ft/sec). Hollman has reported a maximum of 61.1 cm/sec. between 1.0 and 1.5 meters off the bottom in the MACFC 3rd Quarterly Report. The difference between these two maximum reported velocities for New London is close enough to warrant using the conclusion of Morton et al, in evaluating the relative currents at New London and East Hole.

Their results and conclusions are attached as Appendix N and discussed further in Section IV of this volume.

28.9 Comment:

Sediment grain sizes are generally coarser in the vicinity of the New London site; best estimate is about 50 percent silt-clay. At the East Hole site sediments are reported to contain 75 percent or greater silt-clay in the central areas).

28.9 Response:

New London area sediments range from silt on the spoil pile to fine or very fine, poorly sorted sand (as described in the 4th Quarterly Monitoring Report) in the area around the pile.

Sediment sampling at the East Hole site has been undertaken on three separate occasions; Savard (1966) reports of the results of four (4) sample stations, the New England Division, U.S. Army Corps of Engineers (1974) 21 stations, and MACFC (1976) reports the results of 6 stations. Grain size information for all of these sample stations is summarized in the MACFC (1976) "East Hole" report. The results presented cover an area of approximately 6 square nautical miles and are attached as Appendix N.

Sediment distribution for the East Hole may be characterized as follows:

1. The sediments in the eastern 2/3's of East Hole (between 150 - 170 contours) vary between 68% and 76% sand/32% - 24% silt and clay. The samples at the deepest contours (170 feet) average 75% sand/25% silt and clay.

2. Sediment samples for the western 1/3 of East Hole average 64% sand/36% silt and clay (based on 2 reported analyses). One sample reported (PE-18) at the 160 foot contour in this section was comprised of 86% clay 14% silt, but according to the COE core description, the top 3" of the core was gravelly, clayey sand.

3. Cores into the substrates (1-2 feet below the bottom surface) indicate the presence of clay deposits, possibly glaciolacustrine deposits from West Hole.

These results, discussed further in Section IV of this volume, show that the sediments at East Hole are generally coarser than those at New London.

28.10 Comment:

Based on our understanding of winter storm phenomena, seasonal variation in tidal amplitudes and currents, the erosion velocity statistic and the grain size character adjacent to the dump site, one has to conclude that the New London site is at best a moderate to active dispersal site rather than a containment site. Clearly East Hole is the more desirable site for disposal with respect to containment.

28.10 Response:

The possibility of material movement at East Hole and New London under the influence of storm waves is discussed in Section IV of this volume. There is no significant difference in the probability of such movement between the two sites. In the case of New London, however, monitoring results (See Section IV and Response 13.2) have shown no significant

28.10 Response continued:

movement of the dredged material pile between August of 1975 and August of 1976 following the passing of Hurricane Belle. This provides strong evidence that New London will contain the materials under the influences of seasonal storms.

28.11 Comment:

Water depth and the depth at which wind generated waves induce currents equal to the calculated erosion velocity of a sample Thames River sediment are utilized in the Supplement to calculate the theoretical volume of material that could be dumped into an area. Issues associated with how much lateral spread could be tolerated and potential pollution loadings at the two sites were not addressed directly in this analysis. Clearly more material could be dumped at East Hole. The implications associated with any lateral spread and potential pollution loadings at East Hole would be more acceptable there than at the New London site due to the former site's water depth and bottom characteristics, as well as its relative distance to the biological active coastal areas.

28.11 Response:

The potential for lateral spread of materials from the New London Site and East Hole are addressed in Section IV of this volume, as is the relative biological characteristics of the areas surrounding the two sites. In terms of capacity, the SEIS notes in Figure 6-21 that East Hole has more theoretical capacity than does New London (50 million cubic yards versus 41 million cubic yards); either site will hold all the Thames River dredging over the next decade. Additional discussion of the effects of distance to biologically active coastal areas is contained in Section IV of this volume.

28.12 Comment:

Near shore areas are almost always more productive than deeper water offshore areas. Near shore coastal areas such as the juncture of Fishers and Long Island Sounds provide the essential breeding, feeding or nursery areas for the bulk of the fin and shell fisheries resources exploited by man in the region discussed in the Supplement. However, the site biology factor in the Supplement only evaluates the relative ecologies of the sites in question and not commercial or recreational fishing which is discussed as a separate factor below.

28.12 Response:

It was and is felt that the fishing aspect of biology is important enough to man to be considered as a separate element. As noted in Paragraph 6.378, fish populations were included in the biological ranking for the sites. The actual human harvest of fish was treated separately. This separate treatment of fishing is maintained in Section

28.12 Response continued:

IV of this volume. Additionally, Section IV presents the biological data on the two sites and their surrounding areas separately, rather than combining site and area biology, as was done in the SEIS. This does not point to large differences in biological resources between the two areas, nor does it indicate that potential losses associated with material movement would be less at East Hole.

28.13 Comment:

Monitoring studies to date at the New London site indicates benthic recolonization of the material dumped during the Navy's Phase I dredging has proceeded at an acceptable rate. Based on the quality and quantity of Phase II and other project sediments, no predictions beyond one that recolonization is expected are possible. The material proposed to be dumped at New London may not remain confined to the dump point but may be dispersed in time over a relatively large and ecologically productive and sensitive area at the juncture of the two Sounds. A massive loading of fines and pollutants could downgrade the complexity of community structure with a subsequent loss in real value to fishery resources and to man.

28.13 Response:

It is not demonstrable that such a "massive loading of fines and pollutants" will be released in the area. In fact, as noted in Section IV, the spoil pile appears stable as of August 1976 following the passing of Hurricane Belle.

In terms of recolnization of the spoils, ampeliscids are the early colonial species at New London.

Because ampeliscids are sensitive to hydrocarbon and organic pollution, colonization of the berthing area spoil by ampeliscidae may proceed slowly. Initial colonization may actually take place by polychaete worms. Several years after spoil disposal at the Rhode Island site, tolerant polychaetes, molluscs, and sea anenomes were found at the center of the spoil mound. Ampelisca agassizi, which is characteristic of Rhode Island Sound, was found at the edges of the spoil. Such a sequence could be expected at New London, in areas where pierside sediments form the surface of the ultimate spoil pile.

28.14 Comment:

The Supplement reports that benthic faunal diversity is lower at the East Hole site than it is at the New London site. We believe this holds true for the recolonized spoil mound as well as the areas adjacent to the disposal site at the junctures of Fishers and Long Island Sounds. This is predictable for sandy muds and muddy sands almost always support

28.14 Comment continued:

a higher diversity of fauna than does near shore muds and early re-colonization diversity almost always overshoots later values. Based on the data summaries discussed in the Supplement it can be concluded that benthic community response to disposal at the East Hole would be similar to that observed at other containment dumping sites in Long Island Sound where significant quantities of similar material have been dumped in the past.

28.14 Response:

The relative diversities of benthic macrofauna have been extracted from the Quarterly Reports in order to compare the New London Dump Site and the East Hole. In addition to information at each site, the surrounding areas were also included. After the initial disposal of dredge material (Fall 1974) the mean diversity index within the New London Site rose from 2.48 (Summer 1974) to 3.0 (Fall 1974). A sharp decline of 1.22 occurred during the Winter 1974-1975 followed by an even lower diversity of 1.075 for Spring 1975. The next two seasons of summer and fall 1975 showed increases to 1.88 and 1.917, respectively. Although seasonal variations influence diversity indices throughout the year, the comparisons between the two seasons Summer 74 - Summer 75 and Fall 1974 - Fall 1975 show a trend of diversity indices returning to pre-disposal values. MACFC (Fifth Quarterly Report) reports the organisms Nucula proxima, Nepthys incisa, and finally Ampelisca vadorum and Heptocheirus pinquis as colonizing the area at the disposal buoy. At no time did the diversity index overshoot the pre-disposal values and gradual increase of diversity index was observed as a diversity of organisms began colonizing the spoils.

Diversity and stability of a community cannot overshoot the climax community.

It has been hypothesized that since spoils have been deposited at the New London Dump Site since World War II, the diversity indices prior to the recent dredge disposal of Fall 1974 were not reflective of natural conditions. During the season prior to dumping, areas at 0.5 and 1.0 mile west of the dumpsite had similar diversities to the dumpsite. If Bohlen (1976) states drifting of spoil from the dumpsite occurs on a line northwest and southeast, one would expect a decline in the diversity indices of the sample stations west of the dumpsite. This was not the case, the mean diversity indices were similar to those prior to dumping, and any fluctuations were due more to seasonal trends rather than covering by spoils. Also, MACFC 5th Quarterly Report states that stations at a one-mile radius from the disposal buoy displayed no consistent trends indicative of spoiling impacts. Organisms and diversity indices at stations to the west of the dumpsite were reflective of natural silty-sand sediments.

28.14 Response continued:

The diversity indices for East Hole (See Appendix N) were obtained from sample stations within the Hole and surrounding areas. Sample Stations 1, 2, 4 and 6 were located in the East Hole. Sample Stations 3 and 5 were located above the Hole in 117 to 125 feet. The diversity indices were between 1.45 and 2.53 within East Hole during Spring, Summer and Fall 1975 and the mean diversity was 1.74. The average mean outside of the Hole at Sample Stations 3 and 6 was 1.93. Both values are lower than the New London diversities prior to disposal and in areas which represent natural conditions 1 mile west of the disposal buoy. This, however does not provide a basis for an assumption that East Hole would respond similarly to shallower sites in Long Island Sound in the event of disposal there. As pointed out in Section IV of this volume, East Hole may be, partially because of its depth, a physically stressed environment; benthic recolonization may not proceed as rapidly as at shallower sites, such as New London.

28.15 Comment:

While the volume of sediment which clearly exhibits polluting characteristics is relatively small compared to the total volume to be dredged by all parties, the bulk of this material will be dredged last and unless allocated to land, be dumped on top of the pile of cleaner material. As noted in the Supplement, the impacts associated with disposal of this material may be greater than the commulative effects of disposal of main channel sediments due to high contaminant levels and to the fact that it will be more easily moved by currents away from the disposal point.

28.15 Response:

Pier side spoils exhibit higher levels of chemical constituents and make up approximately 25% of the immediate Navy dredging requirement. Environmentally it would be more acceptable to dredge these materials in sequence proceeding in a downstream direction caping the pier side sediments with cleaner channel sediments.

However, engineering limitations prevent pier side dredging from being accomplished until pier construction and pier removal contracts are completed. Therefore channel dredging must be scheduled so as not to interfere with pier side construction projects. In this way, timely completion of the total project is effected without placing undue constraints on the dredging contractor.

It is possible, however, that future management of the disposal site by the Corps of Engineers might allow these pierside sediments (both Navy and non-Navy) to be capped with cleaner dredged material from the lower channel of the Thames River (1980 Corps of Engineers, New London Harbor Improvement Project, 1,634,000 cubic yards) or other dredging sites.

28.16 Comment:

Specifically, this Department is concerned over the subtle long term or chronic effects of dredged material disposal in productive near-shore waters at the New London site and especially the potential degradation of coastal fin and shellfish species utilized as food by man. Biological uptake and mobilization of constituents found in sediments to be dredged is a reality. Indeed, the supplement warns readers on page 125 . . . "since the extent and sources of contamination in organisms frequenting disposal sites have not been determined, the consequences of using these organisms as a food source is not known and should be discouraged."

28.16 Response:

The long-term effects of dredged material disposal are treated at length in Section III of this volume. The information available on the New London Site has shown that, at least for lobsters, metallic uptake has not occurred. The warning given on page 125 of the SEIS represents caution in the face of a relatively short-term data base. That caution will be warranted until further data are accumulated, even though the results to date show no cause for concern.

28.17 Comment:

Closure of the New London Dumping Grounds is consistent with the State of Connecticut's water quality strategy for Fishers Island Sound as recently reflected in the Department of Environmental Protection's position regarding the location of a sewer outfall in the area, the Department of Agriculture's Aquaculture Division's program to establish commercial and recreational shell fishing areas in the region, and developing policy regarding dredged material disposal in Long Island Sound.

28.17 Response:

The comment is noted.

28.18 Comment:

The primary problem with the supplement's analysis (of fisheries) is one of scale and a failure to consider the fact that the Race and parts of Fishers Island Sound should be considered impactable by continued disposal at the New London Dump. Since the East Hole site is expected to contain the material to a significantly smaller physical area than would be the case at New London, the associated impacts of disposal at East Hole become more acceptable, especially in respect to recreational fin and shell fishing. Considerably more recreational fishermen fish

28.18 Comment continued:

nearshore in the vicinity of the New London dump than anywhere near the East Hole. The limited trawling and shell fishing reported to occur in the vicinity of the East Hole area are not believed to contribute significantly to commercial landings from the region considered in the Supplement. The lobster fishery is significantly more intensive near shore in the vicinity of the New London Dumping ground. All evidence presented to date indicates that potentially adverse impacts to total fisheries resources would be more significant at the near-shore shallow-water New London site than at the off-shore deep-water East Hole site.

28.18 Response:

Section IV of this volume discusses the fin-, shell-, and lobster fisheries at New London and East Hole and in the areas surrounding both sites. In terms of these fisheries, East Hole must be viewed as a more productive and valuable area than the New London area. Additionally, there is no reason to expect that, even should material leave the New London Site (which has not been observed), any material would move into Fishers Island Sound. Current meter studies to date indicate that near-bottom transport would be southeasterly, not towards the northeast and Fishers Island Sound. Finally, there is no assurity that the East Hole would contain the material to a smaller physical area than would the New London Site. A recent report from the Dredged Material Research Program (Johanson, et al., April 1976) points out that:

> "Since the tug has virtually no station-keeping control over the barge once it reaches the dump point, wind and current must be low enough to allow the barge to stay on station for the entire time of the dump once it is initiated, or multiple approaches to the site must be made....Even under the best conditions, it is not likely that a tow longer than two barges can be effectively maneuvered into position over a borrow pit unless it is very large."

Since East Hole is farther from shore than the New London Site, the accurate navigation needed for precise environmental sampling would be extremely difficult as would in-situ measurements. In addition, surface tidal currents are larger, making the precise positioning of barges during disposal more difficult and perhaps resulting in a larger initial disposal area exposing a larger surface area of contaminated materials to the environment.

28.19 Comment:

The only conflicting use of the East Hole area cited in the Supplement was the existence of a station of the Block Island/Fishers Island Acoustic Range. There are no obvious reasons to believe that disposal would significantly interfere with the Station's use, or if it did, that the Station could not be moved. Since disposal at the East Hole site would be restricted to a relatively small point in this large area, we believe both Acoustic Range and disposal use of the area is compatable.

28.19 Response:

See Section IV of this volume.

28.20 Comment:

The assignment of equal weights to "Other Uses" and "Fishing" factors does not seem justifiable.

28.20 Response:

The human harvest of fish was considered to be as important as all other human uses combined. This is over and above the ranking for biology, so that a greater weighting did not seem justified. Even so, the effects of a reduced weighting for "Other Uses" was investigated in Section IV of this volume and found not to influence rankings.

28.21 Comment:

Continued disposal at the New London site with subsequent massive dispersal of fines could result in lensing over nearshore sand and gravel deposits, thus potentially preclude their exploitation some time in the future. In addition, by depositing this material at the mouth of the Thames River Estuary, there is a significant probability that some of the material may just find its way back to the dredging sites as a result of estuarine circulation and transport. Disposal at East Hole would obviously reduce these probabilities.

28.21 Response:

If there were sufficient energy to disperse material at the New London Disposal Site there is no "significant probability" that it will then be redeposited as a detectable deposit in shallow sandy areas that are obviously of even higher energy. Furthermore, the transport at the disposal site would be in a southeast direction and probabilities that significant amounts of material might return to the dredging sites are minute. Additionally, there have not been any attempts made to mine sand and gravel from submarine areas near New London; nor does there appear to be any demand which will necessitate this. A representative of New London Sand & Gravel Company (the largest in the area) believes there is no desire to do so anyway, because there is very little to mine. He also doubts whether a permit would be granted.

The Long Island Sound Study (ref. 153) also points out that the potential sand and gravel resources for New London is zero (p. C-1). The New London harbor area also gets the lowest classification of those applied in Long Island Sound, i.e., less than 60% sand and gravel.

28.21 Response continued:

Recovery of sand and gravel from the East Hole area is equally unlikely. The sediments near East Hole do contain sand, but gravel is rare. Additionally, depths at East Hole are too great for economic recovery operations. There seems to be no threat to sand and gravel resources at either East Hole or the New London Site.

28.22 Comment:

The Department disagrees with the Supplement's contention that several years of monitoring are necessary to establish a meaningful data base sufficient to establish a new disposal site. Sufficient data on the East Hole area were present in the Supplement to make a scientifically sound determination of not only the suitability of the site, but the selection of a particular point within the site for dredged material disposal. The base line monitoring monies by and large have already been spent as mandated by the requirement to establish an alternative disposal site.

28.22 Response:

The comment is noted. However, in compliance with the EPA recommendations not to initiate disposal at new sites without sufficient reason, the Navy feels New London is a better site, particularly in the light of data that has shown no unacceptable adverse effects to this time.

28.23 Comment:

It is this Department's belief that the Draft Supplement, with relatively minor modifications and additions of more recent data on the East Hole area, would present a comprehensive Environmental Impact Statement for the designation and certification of the East Hole dumping ground.

28.23 Response:

The comment is noted. See paragraph 11.06 in Volume I of the SEIS as concerns designation of an alternate disposal site.

28.24 Comment:

Clearly, the direct costs associated with barging dredged materials eleven and one half miles further must enter into the decision-making process. However, the distance to the East Hole is comparable to the distance other dredging projects in Connecticut have to be barged for disposal in the Sound. The New York District Corps of Engineers routinely barges dredged materials longer distances. Monitoring costs however, increase as a function of heavy seas and depth. Indirect costs associated with degradation of natural resources at the New London site outweigh the direct costs by a wide margin. In addition, the cost associated with further delay of dredging in the region is neither reasonable nor acceptable.

28.24 Response:

As the Supplement points out, direct costs of dredging, transport and disposal are given a low weight (5%) in the ranking. In Section 6.420 of the SEIS it is stated: "Cost must always be taken into consideration, but as a rule it should only govern in the event that all other factors are equal." The sensitivity analysis results displayed in Table 6-11 show that the ranking of open water sites is not affected at all when cost is completely eliminated from consideration. For further discussion of the relative costs of disposal at New London at East Hole, see Section IV of this volume.

29.0 REPRESENTATIVE PATRICIA T. HENDEL, CONNECTICUT, 40TH DISTRICT

29.1 Comment:

In the past two years there has been a very extensive study of the amount of spoils that have been disposed of at the New London site, and it seems on the basis of the evidence to date that there has been no harm to the area. It's a matter of concern to us that the dredging be continued and that the disposal be done in a way that will not harm the ecology of the river and the use of the river for recreational purposes and the other purposes which we've discussed tonight. (Groton Hearing, P. 85)

29.1 Response:

The comment has been noted.

29.2 Comment:

I think that the New London ought to continue to be used, and that very careful monitoring on a very regular basis ought to continue. On the basis of what we've seen here, if one of the concerns that has been expressed by DEP and Senator Schneller were to occur it wouldn't happen overnight and that there would be plenty of time to stop the dredging and stop the dumping at that site and dispose of the material another way or in other areas. I think it's important to continue and I would urge that the constant and very regular monitoring take place so that no situation could get out of hand; but I think that on the basis of what we've seen the process ought to be continued. (Groton Hearing, P. 86)

29.2 Response:

The comment has been noted. In regard to continued monitoring see Response 22.1.

30.0 BETTY CHAPMAN, RESIDENT, GROTON, CONNECTICUT

30.1 Comment:

The state-of-the-art is (in the scientists' own words) not adequate to tell us whether we do or do not have a long range problem with the New London dump site, either from the 1.5 million cubic yards deposited there last year or the proposed balance of the spoils from the Upper Thames project... We should not hold up a measure important to national defense..... we should not cripple operations at the Sub Base.... the injunction should not be continued. Coincidentally, it could lead to expensive disruptive relocation of hundreds of families. To continue to halt dredging because scientific knowledge has advanced to the point where it tells us we might have a problem is a "the sky is falling" reaction.

30.1 Response:

The comment is noted.

30.2 Comment:

It seems logical to presume that if the coming years prove that we do have a problem at the New London dump site, the accumulated scientific knowledge of those years will produce a way to counter the problem. I urge you to allow the dredging and dumping to continue under continuous monitoring and control.

30.2 Response:

The comment is noted.

31.0 GROTON CONSERVATION COMMISSION

31.1 Comment:

The Commission is encouraged by the published study reports showing that the first phase dredging operation has not had significant adverse effects on the Thames River and may, in some ways, have had a positive impact. Therefore, the Commission does not oppose the proposed dredging itself. However, the Commission voted unanimously to oppose the use of the New London dump site for the disposal of the spoils from this dredging project.

31.1 Response:

The comment is noted.

31.2 Comment:

The Commission pointed out that the New London site does not demonstrate containment characteristics and that there is a high probability of slow persistent movement of the spoils. The spoils, particularly those of the second increment, may exceed the E.P.A. criteria and can be fairly described as polluted. The movement of the spoils may, therefore, constitute a hazard to the benthic community and, in particular, to nearby recreational and commercial fisheries. The Commission recommended that the dredge spoils from the project be disposed further offshore where the probability of adverse effects on our local fisheries and water quality would be less.

31.2 Response:

The ability of the New London Site to contain Thames River sediments is discussed in Section IV of this volume.

The materials to be disposed of were described in detail in paragraphs 3.15 through 3.56 of the SEIS. Both bulk chemical analyses and elutriate testing results were presented. These analyses showed that the material in the samples exceeded some of the criteria, some of the time. Monitoring results from the dredge site and the disposal site, however, have not shown adverse biological effects, except for direct removal at the dredge site and direct burying of organisms at the disposal site.

Section IV of this volume discusses at length the potential hazards to nearby resources at both the New London and East Hole Sites. There is no evidence that the probability of adverse effects to fisheries and water quality would be lessened by moving to the more distant site.

31.3 Comment:

The water current data is contradictory and there is a noticeable absence of detailed information regarding the movement of materials on the dump site.

31.3 Response:

Three types of water current data were presented in the dicussions of the various sites in the SEIS; tidal currents, net drift, and storm-induced bottom currents. Confusion among the types and the conditions under which they were measured or predicted was expressed by many reviewers and led to the preparation of a section on currents in Section IV of this volume.

31.4 Comment:

The uptake of heavy metals by benthic organisms at the dump site has not been measured in any systematic way.

31.4 Response:

The comment is noted. Future monitoring proposals are being evaluated in light of this suggestion.

31.5 Comment:

All that the data can show is that there has been no catastrophic impact from the use of the New London site and we never considered that a serious possibility. The data cannot be used to estimate the middle and long term impacts of the use of this site for disposal of fine-grained polluted spoils and this, we assumed, was the reason for the supplemental report.

31.5 Response:

The data from the New London monitoring effort can only be used to determine middle - and long-term effects when middle - and long-term time periods have passed. The indications to date are that these effects either will not be felt, or have not begun yet. Experience at other sites, such as the Rhode Island Sound Site, discussed in Section III of this volume, indicate that any effects which might accrue would be limited to the area of the site. At Rhode Island Sound, effects on bivalves from much poorer quality sediments are restricted to a radius of 2 km (about 1 1/4 miles). No influences from the New London disposal operation have yet been detected outside the actual disposal area.

31.5 Response continued:

There also seems to be some confusion over the reason for the preparation of the Supplement. The Navy prepared this document to supplement the FEIS by providing additional information on the pierside dredging requirements for the new SSN 688 Class submarines at the U.S. Naval Submarine Base and to correct deficiencies as noted in the decision of the U.S. Circuit Court of Appeals in National Resources Defense Council et al. v. Callaway et al. (2nd Cir. No. 75-7048) dated September 9, 1975.

31.6 Comment:

Data presented in the supplement does, in fact, indicate that there are alternative sites which are superior to the New London site. For instance, the East Hole area reportedly has a species diversity which is lower than that of the New London site which has a low specie diversity solely due to previous spoil disposal, and is surrounded by areas of naturally high species diversity.

31.6 Response:

The comment is not in agreement with literature sources. The diversity indices from the New London dump site, East Hole, and their surrounding areas has been addressed in Response 28.14 and Section IV of this volume.

31.6 Comment:

In the matter of the fisheries resource, the report indicates that there is little to no sport or commercial fishing at the East Hole site. It indicates also that there is little to no fishing at the New London site because it is surrounded by areas which are preferred fishing grounds. New London is then rated more favorably than the East Hole site for no apparent reason.

31.7 Response:

The SEIS, in paragraph 6.290, pointed out that the lobster and quahaug fisheries in the East Hole area were fairly good and that the commercial fin fishery was poor. There is little in the way of a commercial fishery in the New London area. The statement that New London was not fished because of proximity to more favorable grounds (SEIS paragraph 3.66) was made in reference to sport fishing, which is indeed much heavier at the Race than at New London, or for that matter than at East Hole. New London, with its limited commercial fishery, was not rated more favorably than East Hole "for no apparent reason."

31.8 Comment:

Finally, with similar energy conditions, the report finds that the sediments naturally occurring in the New London site are more coarse than sediments at the East Hole site. It would again appear that the data favors the East Hole site.

31.8 Response:

The data did not show that the East Hole contained finer sediments than New London. In fact the opposite is true. An unfortunate typographical error in paragraph 6.284 of the Draft SEIS listed the center of East Hole as containing "75% silt and clay" when it should have read "75% sand/25% silt and clay." This error has been corrected in the SEIS and further discussion of the sediments at East Hole and New London are presented in Section IV of this volume.

31.9 Comment:

These and other examples lead us to believe that the data was not evaluated objectively but rather manipulated to obtain the desired result. The Commmission, then, opposes the continued use of the New London dumping ground for the spoils from the Thames River dredging project. The Commission also deplores the waste of time and money on the Supplemental Environmental Impact Statement which does not appear to answer the questions or meet the objections of the original use of the New London site.

31.9 Response:

The results of monitoring and analyses to date (obtained at considerable expenditure of time and money) have shown that the materials are being retained at New London; that there have been no effects outside of the immediate dredging and disposal areas that can be attributed to the dredged materials; that there are not sufficient land disposal sites to hold the requisite volumes of material; and that there are no other open water disposal sites that offer any significant advantage over the New London Site.

32.0 CITY OF GROTON CONSERVATION COMMISSION

32.1 Comment:

I would not wish, and the Commission would not wish, to see the New London dumping site closed by the Army Engineers. We are concerned with the volume of material placed there regarding the capacity of the area for future dredging both of the Navy and of other interests.

The total volume involved truly is not of long-term significance whereever it's placed in our opinion. (Groton Hearing, P. 94)

32.1 Response:

The comment is noted.

33.0 THE FISHERS ISLAND CIVIC ASSOCIATION

33.1 Comment:

FIRST, as to Retention it ranks the New London site as 1 on a scale of 4 and gives the East Hole a rating of 3. This rating is of special importance because the Retention category is given the heaviest weighting factor, 30%. The Site Information Summary (fig. 6-23, p. 293) gives the following bottom current comparisons:

Currents	East Hole	New London
Bottom tidal current	1.22 ft./sec.	1.7 ft./sec.
Peak wave bottom velocity	0.7-3.6 ft./sec.	7.2-9.0 ft./sec.
90% peak wave bottom velocity	0.05 ft./sec.	0.06 ft./sec.

In all cases East Hole bottom currents are less than those for the New London site. When such data clearly contradicts the opposite conclusion of the Matrix as to Retention, it raises serious questions, especially when the New London tidal current approximates the friction velocity necessary to erode Thames River spoil.

33.1 Response:

A full discussion of the relative currents and potential retention ability of the East Hole and New London Sites is given in Section IV of this volume. The two sites are physically quite similar. The real retention ability has only been measured at one site; New London. As pointed out in Response 13.2, the dredged material is still at the New London Site after a winter storm season and a hurricane.

33.2 Comment:

One paragraph (6.287, p. 270), discussing bottom velocities measured in East Hole, states: "It appears that currents in the bottom boundary area are significantly less than those required to erode the spoil material." Yet the same paragraph later says it is not possible to predict the fate of dredge spoil dumped at East Hole, declares bottom critical velocities necessary to erode spoil were not measured at East Hole and concludes by designating the Hole as a marginal containment site.

33.2 Response:

Paragraph 6.287 points out that the marginal containment designation of East Hole was based on the observed disagreement between the conclusions drawn on current data alone and the conclusion drawn on sediment data alone. Had the sediments at East Hole been clearly indicative of good containment properties, the site would have been ranked as a good relative containment site. Had the current information indicated excessive erosive velocities in the boundary layer, the site would have been designated as a dispersal site. In fact, the currents indicated a relatively good containment site, while the sediments indicated the likelihood of material transport. In the face of this dichotomy, a designation as a marginal containment site appeared and still appears justified (See also Section IV of this volume for further consideration of the relative containment properties of East Hole and the New London Site).

33.3 Comment:

... The Hole appears to have decidedly better Retention capability than New London, especially when we note that the 58' depth of spoil dumped at New London compares with a 230' deep hole whose larger capacity rating is based on filling only to the 150' depth of surrounding waters.

33.3 Response:

It should be noted that East Hole is only 180 feet deep. The nearest 230 foot depth is in the adjacent "West Hole". The influence of waves at the depths of New London and East Hole are discussed in Section IV of this volume. On the basis of data developed from weather records and the current data as developed by Morton et al. (ref. 140) the relative containment characteristics of New London and East Hole appear to be similar in terms of wave induced bottom velocities.

33.4 Comment:

The paragraph's (6.287) reference to sediment studies defies my comprehension since two other paragraphs discussing sediment there (6.283, 6.284, p. 269) refer to finely skewed sediments, a condition likely to retain spoil, and mentions no coarse skewness, a designation for an area of active waste removal.

33.4 Response:

The reference in paragraph 6.283 is to fine skewness measured in sediment on the shoulders of East Hole, not at its bottom. The bottom sediments at East Hole were characterized in paragraph 6.284. A more detailed consideration of these bottom sediments is given in Section IV of this volume. These results still do not present a clear picture of the containment properties of East Hole. The natural sediments there are thin and variable, directly overlying a glacial-aged clay. This might indicate either that there is simply no source of recent sediment to have accumulated at the East Hole, or that it is an area of active material movement.

33.5 Comment:

Further doubts on the New London site's ability to retain spoil are brought out by the bottom velocities measured by the New York Ocean Science Laboratory on 28 Feb 1975 and 21 May 1975 (Vol. 3, 3rd Quarterly Report, p.4 and App. C, p. 13 and 4th Quarterly Report, p.5 and App. C, p. 15). These maximum velocities were reported as 2.0 ft./sec. and 1.9 ft./sec. respectively. These are high compared to the 1.72 ft./sec. erosive velocities discussed in paragraphs 3.61 and 3.64 (pp. 69, 71) and furthermore they are tidal, not storm velocities.

33.5 Response:

As pointed out in Response 20.6, the velocity measurements reported by NYSOL were made one meter from the bottom. At this elevation, it requires a current of 71 cm/sec (2.33 ft/sec) to produce a velocity of 52.5 cm/sec (1.72 ft/sec) at 15 cm (6.in.) above the bottom. Paragraph 3.61 indicates that it is this velocity at 6 inches from the bottom which is required to initiate erosion of Thames River sediments. Thus, the 2.0 ft/sec velocity measured one meter from the bottom is less than the 2.33 ft/sec necessary to produce erosive velocities when measured one meter from the bottom.

33.6 Comment:

Appendix L (p.5) states further detailed study on the East Hole commenced when the Inter-agency Committee in March 1975 reached the consensus that the Hole was the most practicable alternate site. What were the results? They are not in the Supplement. Their lack impedes critical evaluation.

33.6 Response:

See Response 14.1

33.7 Comment:

The category of Fishing with a weighting of 20% gives New London a better rating, an easy conclusion because of the recent dumping. Yet the data on Fishing at the East Hole (6.290, p.272) do not show lobstering, claming, or fishing of any consequence at that site.

33.7 Response:

A review of information on fishing at East Hole is given in Section IV. There does appear to be substantial fishing at East Hole. Lobstering and shell-fishing in the vicinity of East Hole were reported on in paragraph 6.290. It does not seem that these activities are inconsequential.

33.8 Comment:

THIRD, the category of Other Uses, i.e. research and military use, (fig. 6-11, p. 205) gives New London a 1 rating and the East Hole 4, the lowest. The weighting at 15% seriously affects the overall comparison and appears unfair in the circumstances. The Supplement states (6.138, p. 202) that several auxiliary uses by the Navy offer potential impediments to spoil disposal. Referring to the East Hole it says that the necessary operation of the FORACS (Fleet Operational Readiness Accuracy Check Site) restricts and in some cases prohibits dredge disposal operations in that area (6.142, p. 204). Also cited is the Naval Underwater Systems Center acoustic range between Fishers and Block Islands. "While activity is not currently going on in the range... it is reasonable to assume that the range might well be used again." The nature of the studies is such that barge activity, sediment in the water column or alteration of the bottom configuration might hinder research." The University of Connecticut and NOAA are conducting on-going research in the area. The obvious question is not broached; given the relatively short dumping period into a deep hole, cannot the military uses be scheduled without undue effort so that temporary dumping effects will not interfere with research activities.?

33.8 Response:

Section IV of this volume provides a detailed discussion of the FORACS Range and the possibilities of scheduling and routing barge traffic to avoid conflict between disposal at East Hole and the use of the Range; such scheduling is possible. Thus, Section IV also includes a revised ranking that assigns the "Other Uses" a weight of only 5%, and notes the negligible effects of such a reduction on the original matrix in Section 6 of volume I of the SEIS.

33.9 Comment:

FOURTH, the Matrix assigns in the Regulatory category a 1 rating to New London and the lowest, 4, to the Hole. In justification, the Supplement (6.403-6.407, pp.305-307) cites as the significant disadvantage of the East Hole the current lack of information as to its characteristics and suitability as a disposal site. It adds that while East Hole is under consideration as an alternate to New London, there is no on-going monitoring program there and, since several years are necessary to establish a meaningful data base, such a program would require a substantial investment.

33.9 Response:

The Regulatory ranking was designed to help in selecting a site at which strong controls could be exercised over any disposal operation. This is certainly the case at New London, where Federal, State and private citizens are interested in the activity. Only Federal control would be exercised at East Hole, so that it was ranked with the other sites which were outside of State jurisdictions.

33.10 Comment:

After three years of controversy and objections raised concerning the only two officially designated sites, Rhode Island and New London, why has no other site yet been designated? Could the answer be that no determined effort was made to fine one?

33.10 Response:

The effort has and is being made to evaluate other disposal sites. This SEIS addresses and evaluates the environmental consequences of ocean disposal at 15 such sites. See Sections 6 and 11 of Volume I of the SEIS.

33.11 Comment:

The additional cost of the Rhode Island site is estimated at about 62% over New London. (6.,193, p.239) Since the East Hole is far closer than the Rhode Island site to the dredging, the cost (not given in the Supplement) would not, it would appear, be insurmoutable, especially when contrasted with the cost of just one of the new submarines.

33.11 Response:

Section IV of this volume points out that there may be a 50% cost differential between East Hole and New London. Nevertheless, Elimination of cost from the ranking procedure (see Table 6-11) made no change in the site rankings.

33.12 Comment:

SIXTH, and last, the Site Evaluation Matrix omits categories wherein the East Hole site might be clearly preferable to the New London one. They could be called (1) Dilution and (2) Proximity to areas of high productivity. In both these categories the site location, within or without Long Island Sound, and near or farther from areas of high productivity, yields factors favoring the East Hole site over the New London site. One might expect these considerations to be accounted for in other categories, but they are not. For example, the category Biology (6.378, p. 299) refers only to the site itself, not nearby areas.

33.12 Response:

The utility of Dilution and Proximity categories is discussed at length in Section IV of this volume. There it is pointed out that simple distance is not a relevant measure for potential effects of spoil disposal. Further, paragraph 3.378 of the SEIS indicates that the original Biology ranking for the sites included consideration of the site and its environs. This aggregate measure is disaggregated in Section IV, where a very detailed comparison is made between biology and fishing at East Hole and New London.

34.0 CHAMBER OF COMMERCE OF SOUTHEASTERN CONNECTICUT

34.1 Comment:

The Chamber of Commerce would like to go on record in full support of the resumption of the Thames River dredging project.

The continued dredging operation from the Gold Star Bridges to the Submarine Base is essential for the passage of the larger 688 class submarines. The U.S. Naval Base in Groton is a vital element in the economic well being of Southeastern Connecticut. Any major reduction or threat of reduction of operation at the submarine base could have a devastating effect on the employment, business and overall economic climate of our region. We feel the dredging project would not only benefit our military community but would be beneficial to commercial shipping in the New London Harbor as well.

34.1 Response:

The support of the Chamber of Commerce is noted. The additional benefits which might acrue to the commercial shippers at New London (discussed in paragraph 5.71 of the SEIS) was a part of the overall considerations for this proposed effort. The Navy hopes to remain a vital part of the economy of Southeastern Connecticut and has no plans for reductions in their operations at New London.

34.2 Comment:

The Chamber would also like to go on record in support of disposing the dredge spoils at the "New London Dumping Ground." (South of New London Harbor, and West of Fishers Island.)

Based on the findings of the Draft Supplement to Final Environmental Impact on the Dredging of the River Channel, we have concluded that using the dump site for the dredge spoils will not have an adverse environmental impact and will not adversely affect the sport or commercial fishing industries in the area.

In view of these facts, Mr. Chairman, the Chamber of Commerce of Southeastern Connecticut respresenting over 600 businesses in the region, strongly urges and feels it to be imperative that there be an immediate reinstatement of the suspended Navy permit to continue dredging.

34.2 Response:

The Navy analysis of 15 alternative disposal sites indicated that New London might be the most suitable. The final decision on disposal location, however, will be made by the Corps of Engineers in their deliberations on the reinstatement of the suspended permit. The position of the Chamber of Commerce will be considered in those deliberations.

35.0 REPUBLICAN TOWN COMMITTEE, GROTON; REPUBLICAN CITY COMMITTEE, GROTON

35.1 Comment:

Resolution Regarding Dredging

Joint resolution noting potential community impact of failure to complete dredging, stating that such impact appears to outweigh the definable ecological consequences of the dredging itself and of disposal of the dredgings as evidenced by data presented concerning the 1.4 million cubic yards recently dredged and deposited last year, and asking that the injunction be removed. Presented at Groton Hearing (P110-111) by Kenneth G. Chapman.

35.1 Response:

The resolution is noted.

36.0 KENNETH G. CHAPMAN, RESIDENT, TOWN OF GROTON

36.1 Comment:

The New London Dumping Ground seems to represent a case in which our scientific experts have clearly and honestly told us we may someday find we are causing a problem, but the state of the scientific art is not today capable of conclusively indicating we do or we do not. Nor is it capable of predicting when we will really know. All conclusions quoted tonight (at the Groton hearing) by the DEP, were qualified as being subjective. Hence, we have a benefit to risk matter here.

36.1 Response:

The comment is noted.

36.2 Comment:

There is no question that adverse effects will occur if we don't finish dredging the Thames. One 688 boat, I understand, is already affected by the delay which has occurred. The potential impact to our National Defense posture, the ultimate social and economic threats to thousands of people in the Groton community, all are obvious. In fact, they do not even seem to be controversial. That the dredging will benefit, rather than adversely affect the Thames River itself apparently is not even controversial.

36.2 Response:

The comment is noted.

36.3 Comment:

I feel the scientific community can do a lot. Personally, I am confident that if we finally do find there is a problem occurring, we will be at some time -- at the same time, or not much later, discover methods to counteract the problem.

36.3 Response:

The comment is noted.

37.0 LARRY L. VANDERHORST, RESIDENT, MYSTIC CONNECTICUT

37.1 Comment:

It seems like all the opponents to the New London dump site have been speaking with words of discrepancy, doubtful, possibly and probably factors, but no significant numbers. What we do know is we've been dumping at the New London dump site for approximately 35 years. We haven't had any adverse effects to it. We've had recolonization with the -- like they called then last night -- little critters and no movement. So, therefore, I would urge that we would immediately remove the injunction against the Navy and continue dredging and dumping in the New London dump site. (Groton Hearing, P. 115)

37.1 Response:

The comment is noted.

38.0 LANGDON L. DAVIS, SIERRA CLUB

38.1 Comment:

I would like to point out that the latest quarterly report for the analyses of the dumping so far, dated August 1975 which was 10 months ago, no reports have been received since that time that I know of. These reports are important. We need them to further evaluate the site. I understand informally that in a recent report prepared for the first quarter of this year there may be some changes which should be observed to find out what they really are. (Groton Hearing, P. 116)

38.1 Response:

See Response 13.3

38.2 Comment:

I'm a little concerned about the total size of the dumping along the coastal Connecticut and Rhode Island Shores. We've been talking for several years now about two or three million tons, but now they are up to at least 15 million tons looking forward to 1985. Certainly in that 10-year period it will probably go up to 20 or 25. We've got a significant amount of dumping being planned to put somewhere. (Groton Hearing, P. 117)

38.2 Response:

While it is always possible that new requirements may develop, the most up-to-date projections require 15-16 million cubic yards of dredging, as indicated in the SEIS.

38.3 Comment:

The dredged materials are generally high polluted. In some cases it exceeds the federal regulations for ocean dumping; and dispersal of this material is inevitable. Their own report reports that 95% of it stays put. That means 5 percent is moving somewhere else every year. This dispersal must not be permitted near out coastal areas, particularly in those that are enclosed and not exposed to the open ocean. (Groton Hearing, P. 118)

38.3 Response:

The accuracy of the spoil pile calculation is 95% (as explained in Response 13.1). This is not an implication that 5% of the material has left the site.

219

38.4 Comment:

The Sierra Club finds it unacceptable to permit any significant dumping inside Long Island Sound or Fishers Island Sound. Some wider dispersal options must be evaluated. (Groton Hearing, P. 118)

38.4 Response:

No disposal is proposed for Fishers Island Sound and disposal to date at the New London Site has shown no detrimental effects other than at the disposal site. In the reconsiderations of the SEIS, a total of fifteen disposal sites were considered, most of them outside of Long Island Sound. If this is the meaning of "wider dispersal options" in the comment, then the SEIS met that need. If, on the other hand, the comment requests a consideration of dispersion sites, all sites of this type were eliminated from consideration. There seems to be no environmental justification for dispersing the Thames River dredged material.

39.0 LAW OFFICES OF BUTZEL AND KASS

39.1 Comment:

The long-term impacts are indeterminable at this point. But given that fact, it remains my view and I confirm tonight that it remains Frank Bohlen's and Mickey Weiss' view that we ought to try and diminish the risk, and neither of them have changed their opinion. Those opinions were stated articulately and well and yet, within the Environmental Impact Statement, there is not the slightest indication or the slightest reference to those opinions and neither of them have been asked anything further about their opinions.

39.1 Response:

Dr. Frank Bohlen was interviewed (see contact list) on three separate occasions during the preparation of the SEIS (23 July, 12 November, and 10 December 1975). Additionally, both his and Dr. Mickey Weiss' views have been specifically set forth and addressed in this section and were the basis for many of the considerations in the SEIS.

39.2 Comment:

I think that there would probably be quite broad support for the East Hole site at this time based on the relative environmental considerations.

I trust that you will take that into account. If there is urgency here you will do better, I believe, to reach an accommodation that will satisfy environmental constraints and will satisfy, what are usually anti-political problems, but in this case might not be that. (Groton Hearing, P. 122-123).

39.2 Response:

The comment is noted.

40.0 J. N. SPILLANE, ELECTRIC BOAT DIVISION OF GENERAL DYNAMICS CORP.

40.1 Comment:

We have suffered for several years now with attempts to also dredge, in the neighborhood of our piers, and dispose of dredged material someplace and I should note at this point that we already hold state permits to dispose of almost a quarter of a million yards in the New London Harbor dump site. So, although apparently, current decisions are that that is an unacceptable containment site we hold state licenses and water quality certificates to put a quarter of a million yards of Thames River material in the New London Harbor dump site. (Groton Hearing, P. 124)

40.1 Response:

The comment is noted.

40.2 Comment:

The scientific community still has concerns that the ultimate -- and ultimate means whether it is 10 years, 20 years, of 100 years -- they have concerns about the problem with dredging the river and disposing material on Long Island Sound. We can observe that years ago almost a half million cubic yards was disposed in Long Island Sound and nobody has demonstrated that there is a visible impact from that. More recently there has been a million and a half cubic yards disposed in Long Island Sound and again, there is no discernable evidence that there is certainly a short term impact and it is unlikely that there is a long term impact. We are not talking about an impact on the Town of Groton, the City of Groton or the City of New London. Consequently, our reading of the data to date is that it is only a statistician's nightmare that suggests that we have to worry about the long-range future; (Groton Hearing, P. 126)

40.2 Response:

The comment is noted.

40.3 Comment:

We have an interest when we note that the Thames River, which is a spawning ground well known to us for most of the fishing species available, is the same home and the same estuary and environment for all of the sediments we're talking about; and apparently these aren't severe enough to cause the local people concerned about the fish habitat, the shellfish habitat and so on. (Groton Hearing, P. 126-127)

40.3 Response:

The comment is noted.

40.4 Comment:

But if we deny the New London Harbor dump ground for any disposal purposes what we are doing is suggesting that no taxpayer in the Town of Groton can ever take another cubic yard of mud and move it anyplace except 7 to 10 miles off shore. I think you have to consider that seriously. If the risk of the potential risk of putting Thames River sediments, which we understand and we live with every day, in the middle of New London Sound so severe that we should deny the use of Long Island Sound forever for any Groton resident, any New London resident. (Groton Hearing, P. 128)

40.4 Response:

The comment is noted.

40.5 Comment:

So, my personal reading of all of the data that has been developed to date says that there is a hypothetical risk that in the 20 to 100 year future we may be contaminating some Long Island Sound organisms exactly the same way we are presently contaminating some Thames River organisms, but we're doing with a fractional part of the Thames River sediments. We are doing it over a very large area and if that mud is dispersed from -- incidentally it's a quarter of a mile mud pile right at the moment. We're talking about dispersing it over six to ten miles of Long Island Sound bottom. I tried to run a slide rule the other night and I said well that was like 4,000 times as much area as the mud presently occupies; and I found it hard as a scientist or an engineer to believe that that diffusion of that mud was terribly serious. (Groton Hearing, P. 128-219)

40.5 Response:

The comment is noted. Wide dispersal of the spoils, however is not expected.

40.6 Comment:

I was at a hearing here two nights ago when Dr. Bohlen, I think, made the most cogent statement. He said it is no longer a scientific argument. I hope that I am quoting him correctly. It's a political argument; and by that I'm sure he did not mean political parties. He meant it's a public argument. Can we take a very remote risk that putting

40.6 Comment continued:

that mud in Long Island Sound is sufficiently serious to force the Navy and all other shoreline residents to go there forevermore. Our decisions in the past have said that it is not that serious. (Groton Hearing, P. 130-131)

40.6 Response:

The comment is noted.

40.7 Comment:

We have read the evidence of four years and think that it says that you can continue to go there at least for this next increment of Navy dredging. I don't think we should be dazzled by numbers of five and fifteen million cubic yards because those subsequent dredging projects can be evaluated just as carefully as this current one. I think that we can eat our way into it. If somebody wants to dredge under the five million yards in another ten years, we will have ten years more data or more observations of the New London Harbor dump site. At that time we ought to weigh that very carefully as to whether we should continue; but I'm not at all convinced that continuing with the small increment that the Navy wants to do now or that frankly our permit asks to do another quarter of a million should be deferred any longer. (Groton Hearing, P. 131-132)

40.7 Response:

The comment is noted.

41.0 NICOLA NAGLE, RESIDENT, NEW LONDON, CONNECTICUT

41.1 Comment:

My point is this: from what I've heard here tonight that the East Hole is the ideal Hole. (Groton Hearing, P. 132)

41.1 Response:

The comment is noted. Further discussion of the relative merits of East Hole can be found in Section IV of this volume.

41.2 Comment:

The injunction that's got the dredging held up could be lifted if the Navy and the Corps of Engineers got together. There seems to be a division amongst themselves. (Groton Hearing, P. 132-133)

41.2 Response:

The "division", is that between an applicant for a permit and the permitting agency, and is proper to maintain.

41.3 Comment:

I say to set out there, because we're not talking about a million cubic yards of bottom. We're talking in the terms of 6 to 8 possibly 10 million cubic yards over the next ten years. If you use the New London site -- if the million and some cubic yards made a pile of about 18 feet, what will 10 million cubic yards do. It will come right to the top if that is a good containment site. But from what I see, it isn't. It will be scattered. (Groton Hearing, P. 133)

41.3 Response:

As pointed out in paragraph 5.50 of the SEIS, the projected spoil amounts will fill the New London site to an average depth of 4 feet.

41.4 Comment:

I can't see any reason why this argument of why -- how much money would there be in traveling that distance. Everyone has put their point over tonight. I would like to see it moved up to the East Hole. (Groton Hearing, P. 133)

41.4 Response:

The comment is noted.

42.0 KEN WATTRASS, RESIDENT, GROTON, CONNECTICUT

42.1 Comment:

About 20 years ago, I think the Navy had the western states for the mud sucker up there at the upper Thames, and I was the unfortunate person to have one of the, probably the only house on the river. I've seen the fumes that turned my white house brown and if you've got a hole to dump that much into you better put it in a hole and cap it because I don't know what is in that mud -- God only knows -- but the people were in an uproar when they put it on the property -- you could just about drive by there without getting sick. It's very toxic. I don't know what's in the mud, like I said, but if you've got marine life that can live in it, it's a miracle.

42.1 Response:

No land disposal of spoils is proposed in conjunction with this effort. Additionally, the spoils are already recolonizing, indicating that marine life can inhabit the spoil.

43.0 H.M WEISS, RESIDENT, GROTON, CONNECTICUT

43.1 Comment:

Let me just simply state that in my opinion the data presented in the supplement to the Final Environmental Impact Statement are inadequate to support the stated conclusions that the New London dump site is a containment site, or that it should be given a preferred ranking over all alternate disposal areas.

43.1 Response:

The comment is noted.

43.2 Comment:

I think part of the problem with the analyses of the varied parameters that were used to determine which site was preferred, was that in each case, especially in the areas of fisheries and sediment type and species diversity, a spoiled area, the New London site, was compared with natural areas such as East Hole. Naturally the sediments at the New London site were fine. The species diversity was low and the fisheries in the area was negligible. That is consistent with the fact that you have an area that has been spoiled. The materials were fine because they were dumped there. The species diversity was low because the animals were impacted by the disposal, and the fisheries is low because no one can trawl over a mud pile.

43.2 Response:

Section IV of this volume presents a discussion of the sediments, benthic biology, and fisheries at New London and East Hole and at the areas surrounding them. As shown there, the natural sediments at New London are finer than the natural sediments at East Hole, the benthic biology of the two areas is similar, and the fisheries value of the East Hole area is probably somewhat higher than that at New London. This is based on the areas around the sites, as well as the sites themselves.

Even so, it should be repeated that, given two similar sites, much of the regulatory guidance favors the use of existing disposal sites over the opening of new sites. This preference, among other things, would favor New London over East Hole.

43.3 Comment:

Whereas, in the East Hole site, the materials are fine naturally. The area is seldomly fished naturally, and the species diversity, in fact, was lower in the East Hole naturally than it is in the New London site even under the spoil conditions. I feel that the bias in the matrix, in the analysis of that matrix, was that these were not independent parameters, but those parameters were all, in fact, related to the fact that you were dealing with a spoil dump site.

43.3 Response:

As discussed in Section IV of this volume, the sediments at East Hole are somewhat coarser than those at New London, there is an active fishery at East Hole, and the two benthic communities are similar. Many of these parameters are, indeed, related to the past use of the New London Site for disposal, but only in the immediate area of the site. The information presented in Section IV includes the data on surrounding areas.

43.4 Comment:

I do feel that it sort of reminds me of a story about the young man who killed his parents and then threw himself on the mercy of the court because he was on orphan. I feel that we have a similar relationship here with comparing a site that has been spoiled and comparing that with a site that has natural characteristics that might make it a good disposal area.

43.4 Response:

The comment is noted.

44.0 F.B. BUCHANAN and ASSOCIATES

44.1 Comment:

I think that completion of the Thames River dredging project is vital to the nation as well as to the Navy. It is certainly of great importance to the future of the Submarine Base and to Groton and New London as well, for the fortunes of all are definitely linked.

Our local service clubs, the Navy League and the Chamber of Commerce have all provided open forum for discussion of this important matter and not once has a valid factual reason been advanced for delaying further the completion of this important project. Every argument in opposition has been based on conjecture.

44.1 Response:

The Comment is noted.

45.0 R. FROMER, RESIDENT, NEW LONDON

45.1 Comment:

Under the National Environmental Policy Act, the Navy and the Army Corps of Engineers are obligated to determine the cumulative effects of all dredging on population growth in the project area. As you are aware, the Navy and its programs have been predominantly responsible for the excessively high growth of population in the New London County area and the attendant problems associated with the poorly planned utilization of resources by Federal, state and local agencies.

National security is highly dependent on the protection of the human species which appears to be low on the priority list of the Navy.

It is hereby recommended that the Navy be requested/required to study the macro and micro effects of continued population growth on the human environment in New London and its adjacent communities.

45.1 Response:

Current plans project a stable SSN loading in the New London area for the forseeable future. It is expected that 688 class submarines will be assigned to New London on a one for one exchange with older submarines. Accordingly, the population increase, as a result of SSN 688 homeport assignments will be but a fraction, less than one half of one percent, of previous military population. No primary or secondary effect can be predicted as a result of this change.

The Environmental Impact Statement on the NAVSUBASE Master Plan considered population and economy as effected by all proposed Navy projects. This Impact Statement has been through the public agency review process and will be filed in Final form in the near future. Secondary impacts related to the dredging action have been addressed in section 5 and Appendix A of this Supplement.

46.0 PFIZER INC. - CHEMICALS DIVISION

46.1 Comment:

The accumulated spoils at the bottom of the Thames River are probably more polluted than any sediment which will accumulate in future years. The present material was deposited during the years when inadequate pollution control allowed raw sewage and heavy metals to accumulate.

46.1 Response:

The comment is noted. The bulk of the material to be dredged is considered unpolluted (see Response 56.5).

46.2 Comment:

Presently with municipalities and industries responding to the Federal NPDES Program, the future accumulation which will require maintenance dredging may very well fall within the EPA allowable parameters. Therefore, the New London dump site should be reserved for future approvable dredge spoils and local minor dredging.

The material now in the river should be sent to the East Hole which should be reserved for the disposal of spoil material which will not meet present EPA requirements.

46.2 Response:

Future materials dredged from the Thames may, indeed, be cleaner than current sediments, but there seems no environmental justification for preferring East Hole over New London as a spoiling site.

47.0 EDWARD A. ZURAW, PhD, RESIDENT, TOWN OF LEDYARD, CONNECTICUT

47.1 Comment:

It would have been useful to point out the following: the relation of area spoiled by dumping to total area available for other beneficial uses, the immense dilution available and the natural processes acting to counteract man-made perturbations, the quantity of sediments discharged naturally by rivers in relation to quantities that will be dumped.

47.1 Response:

The dredged material at the New London Site now occupies an area some 800 yards long and 400 yards wide. This is an area of about 0.1 square miles. The water directly over the material (about 60 feet deep) has a volume of 0.17 billion gallons. The Long Island Sound Study (ref. 151) reports that Long Island Sound has an area of 1,300 square miles and contains a volume of 16,800 billion gallons. Thus, the disposal area represents 0.008% of the surface area of the Sound, and the water over it represents 0.001% of the Sound's volume. Although rapid movement of the materials is not expected, these are the areas and volume dilution factors available. The SEIS does point out the recolonizing at New London (paragraph 5.44 and 5.57) which are already counteracting this perturbation. The Thames River is most often a receiver of sediments, rather than a discharger of sediments. This is characteristic of narrow, salt-wedge estuaries.

47.2 Comment:

The facts or considerations supporting or contradicting selection of dispersal or containment sites should have been emphasized.

47.2 Response:

A full discussion of these factors was made in the FEIS and not repeated in the SEIS. There is no question that maximum feasible containment is the desired requirement for New London spoils.

47.3 Comment:

Tabular synoposes of all known studies on dredge spoil monitoring, supporting or contradicting environmental harm, might have allayed some fears.

47.3 **Response:**

These studies were used extensively in the preparation of the SEIS and are included in the bibliography.

47.4 **Comment:**

What is the chemical form and solubility of the known dredge spoil pollutants in seawater?

47.4 **Response:**

The concentrations of dissolved ionic species of the spoil materials in seawater was implied by the elutriate tests reported in paragraph 3.52 through 3.56 and Tables 3-14 through 3-17 of the SEIS. These are emperical indications of relative solubilities with regard to the mobility of sediment chemical constituents into the water phase. Elutriate tests may not, however, be representative of in-situ conditions.

47.5 **Comment:**

Based on speciation and solubility, what is the probability that the pollutant concentrations attainable at the dump site and upon mixing with ambient water, will cause mortality, decreased growth rate, lower fecundity, etc., of the biota, based on natural processes occuring at the site?

47.5 **Response:**

No such influences have been detected at or near the New London site, either during or after Phase I disposal. Therefore, probability cannot be addressed. Although solubility of specific ions are an important consideration, biological factors may be just as important. The effects of dissolved chemicals on mortality, as they influence growth rates, and fecundity may be offset by such factors as physiological adaptability, competition, genetic variance/resistance within biological populations.

47.6 **Comment:**

What proportions are the various pollutants in suspended spoil sediments excreted and transformed into body weight by filter feeders? Are the organisms stressed in some way by ingestion of contaminated sediments?

47.6 Response:

Lobster flesh analyses, reported in the Section III of this volume have shown no uptake of heavy metals. No stress conditions were found in these examinations. Additionally, examinations of shellfish living in the River sediments, reported in paragraph 5.04 of the SEIS, showed no abnormalities.
This would seem to indicate that they are not excessively stressed by living in the materials to be dredged.

47.7 Comment:

What is the erosional current velocity for actual Thames River sediment?

47.7 Response:

The erosional velocity of Thames River sediments, reported in Paragraph 6.214 of the SEIS, is 1.7 feet per second (52.5 cm/sec) measured at six inches (15.25 cm) from the bottom.

47.8 Comment:

What is the accuracy and/or precision of numbers used in the arguments, and is the methodology adequate?

47.8 Response:

Accuracy of spoil pile measurements are given in Response 13.1. The methodology used to compare sites is a matrix rank-sum technique widely used to assess environmental suitability. The techniques used to make physical and biological measurements are described in the Quarterly Monitoring Reports and Appendices to the SEIS.

The methodology used in comparing the various alternative sites in the SEIS is a weighted numerical rank sum comparison. Such a procedure has the virtue of clearly stating the criteria used in comparison and the importance assigned to each. Not only does this clarify the evaluation process, but it is also reproducible in that it provides a clear record for later reader/analysts. This characteristic is particularly important in a case such as this where comparison of dissimilar, often unquantifiable, factors must be made.

While this method of evaluation has gained popularity in recent years, it has actually been practiced for some time. A 1937 report to the USDA by M.H. Sanderson (ref. 301) established criteria for various land uses based on a combination of various types of data to determine overall suitability for a particular use. A 1941 report to the National Resource Planning Board also used such a combined suitability approach to classify lands for optimum use (ref. 292).

47.8 Response continued:

More recently, McHarg has applied various types of development (Ref. 279). In each of these three examples, the ultimate product has been a map displaying suitability of areas for specific uses. These maps, however, resulted from ranking, weighting, and summing of environmental data similar to that shown in the SEIS.

Application of these methods in the coastal zone was recently noted by the Coastal Zone Management Institute. They discussed tabular (matrix) comparison of coastal sites for human uses as follows:

> "Matrices of these types actually may represent a net benefit cost summary based on the evaluation of impacts that result from activities associated with each proposed use." (Ref. 280)

The matrix approach in the SEIS was predicated on just such a benefit cost evaluation, with its intent being to minimize the net cost to a large range of both natural and human Environmental elements. Of even more direct comparability is a recent study by the Maryland Department of Natural Resources. (Ref. 288)

This study used a weighting and ranking technique to evaluate alternate dredged material disposal sites near Baltimore. The parameters considered in the Baltimore study were nearly identical to those used in the SEIS analysis, but the Baltimore study did not apply sensitivity analyses to the results, as was done in the SEIS.

Thus, the weighted numerical rank sum comparison has a long history of use in the terrestrial environment and a growing use in the coastal environment. It has stood the test of time as a method for clearly presenting the results of comparisons based on many factors, some not amenable to quantifications.

48.0 U.S. SENATE COMMITTEE ON GOVERNMENT OPERATIONS

48.1 Comment:

I understand that the Corps and the Navy would prefer to dispose of the dredge materials at the New London Dumping Ground in the Sound.

48.1 Response:

The Navy has no a priori preference for one site over another. The analyses embodied in this SEIS does, however, indicate that New London may be a more desirable disposal site than other alternatives. None-the-less, the final decision on the disposal site will be made by the Corps in its permit decision and the Navy will abide by that decision, whether it is for New London or some other site.

48.2 Comment:

....the State of Connecticut has urged that disposal should not be renewed at the New London site and that a new site within the East Hole area should be utilized as a regional disposal site...

Although the East Hole site may be somewhat more distant than the New London one, I believe other factors -- such as the impact on fishing, the future of ecosystems in the Sound, containment capacity and retention ability -- far outweigh whatever additional expense may be involved, particularly in view of the fact that the distance to the East Hole is about the same as other dredging projects in Connecticut which must be barged for disposal in the Sound.

48.2 Response:

Other factors do outweigh costs in comparative analysis of alternate disposal sites presented in paragraphs 6.409 through 6.426 of the SEIS. As shown on the Site Evaluation Matrix (Figure 6-22), retention, capacity, biology, and fishing are collectively weighted at 70%, out-weighing cost by a factor of 14. In addition, a new comparative analysis of New London and East Hole is presented above in Section IV of this volume. In this analysis, as well, costs are given but a very small weight in the ranking process. Comparisons of the biological productivity, fisheries yield, and containment properties of the two sites dominate the considerations there and indicate that New London may still be a more favorable site for dredged material disposal than East Hole.

48.3 <u>Comment</u>:

The Connecticut DEP has presented a very comprehensive and well-reasoned statement which warrents close attention.

48.3 <u>Response</u>:

The statements of the Connecticut DEP (Comment Numbers 28 and 61) have been considered in detail in these responses. Additionally, many of the points raised in these statements formed a partial basis for the detailed re-analysis of the relative merits of East Hole and New London presented above in Section IV of this volume.

49.0 LEAGUE OF WOMEN VOTERS, RIVERHEAD-SOUTHOLD

49.1 Comment:

It is unclear to us whether the designated 'retention' in the Draft Supplement, EIS, Vol. 1, 6.363 and Fig. 6-22, relates only to whether the spoil is clayey or loose, or if this designation includes within it the polluted quality of the spoil. Fig. 6-22 does not appear to include any cost relating to the polluted quality of the spoil.

49.1 Response:

The retention designation is intended to measure the relative ability of the various sites to contain Thames River sediments. The choice of a retention site seems wise for these spoils, as discussed in paragraph 6.363. Figure 6-22 does not include costs related to the polluted quality of the spoil. The cost item refers to the direct cost of disposal at a site.

49.2 Comment:

In our opinion, the Draft EIS does not adequately address the problem of potential long-term effects of pollution. Are these pollutants expected to remain stable forever? Are any soluble, and if so, are they soluble over a short term or over a long term? Will there be any synergistic effects between pollutants, or between pollutants and sea water over "x" number of years?

49.2 Response:

Long term chemical influences are discussed in Section III of this volume.

49.3 Comment:

Sec. 3.51 (p. 58) states that the "small amount of radionuclides in the sediment to be removed will be of no significance and will have no effects..." Were the radionuclides emitted from the following sources considered: Millstone I and II plus Millstone III under construction; the Connecticut Yankee nuclear power plant at Haddam; Shoreham I, under construction on Long Island? How great a burden of radionuclides is permissible in the food chain?

49.3 Response:

See Responses 18.3 and 18.4

50.0 POINT JUDITH FISHERMEN'S COOPERATIVE ASSOCIATION, INC.

50.1 Comment:

The Point Judith Fisherman's Co-operative Association,Inc. would like to go on record as being opposed to the above site (East Hole) as proposed by Melvin Schneidermeyer, Deputy Commissioner of the State Department of Environmental Protection (Connecticut).

If the Deputy Commissioner feels that the risks associated with renewed dumping at the New London site are not acceptable to the State of Connecticut, why does he think the dredge material would be acceptable to the fishermen of New York, Connecticut and Rhode Island at East Hole - a vital fishing area? Boats from Montauk, N.Y., Stonington, Conn, and Point Judith, R.I. fish at the East Hole and the immediate surrounding area.

50.1 Response:

The comment is noted.

51.0 THE SOUTHERN NEW ENGLAND FISHERMEN'S ASSOCIATION, INC.

51.1 Comment:

The Southern New England Fishermen's Assoc. wants to go on record as being against this Proposal. (Disposal at East Hole)

This area is used by the Commercial Fishing Industry and is not a dumping ground. We would suggest that another area be considered for the disposal of this Silt.

51.1 Response:

The new information embodied in this and the previous comment led to the reassessment of the value of East Hole fisheries presented above in Section IV of this volume. This reassessment indicates that the fishery at East Hole is more extensive and valuable than was suspected when the Draft SEIS was prepared.

52.0 STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS, DEPARTMENT OF NATURAL RESOURCES

52.1 Comment:

I would strongly suggest that before the Corps even consider the request from the State of Connecticut for disposal at "East Hole", that further studies be done to determine beyond doubt that there will be no adverse environmental or other effects on the Rhode Island coastal zone.

52.1 Response:

The comment is noted.

52.2 Comment:

It would seem from the testimony at the public hearing, that the State and local governments are badly split on the adverse effects of re-designating the New London dump site; and any decision by the Corps must be based on the environmental data presented at the hearing.

52.2 Response:

The comment is noted.

52.3 Comment:

If the Corps of Engineers considers the request of the State of Connecticut to designate "East Hole" as an alternate dump site, I would request that all the necessary environmental impact studies be made and that public hearings be held within the boundaries of the State of Rhode Island so that state, local and all interested citizens be given the opportunity to voice their opinions for or against the designation of "East Hole" as a dumping site.

52.3 Response:

The comment is noted.

53.0 U.S. DEPARTMENT OF THE INTERIOR - NORTHEAST REGION

53.1 Comment:

We consider the supplement to be adequate in its consideration of outdoor recreation.
The supplement presents a good discussion of proposed dredging activities in the Thames River and surrounding area. It also pulls together, for the first time that we are aware of, a listing and discussion of possible land disposal sites.

53.1 Response:

The comment is noted.

53.2 Comment:

A statement in Paragraph 3.22, Page 36, indicates that the bulk chemical analyses of dredged material should not be used for assessing the effects of spoil disposal on the environment. Further on, in Paragraph 3.52, Page 59, it is indicated that elutriate analyses of dredged material should not be relied upon to accurately evaluate dredged material for ocean disposal.

Although these two statements are true to a degree, it has recently been brought out by the poly-chlorinated byphenyl (PCB) problem that bulk analyses of sediment may be a valid indicator of the pollution characteristic of dredged material. For instance, when high PCB levels were found in Hudson River fish, no PCB's were detected in the water column, but high levels were found in the river bottom sediment. This indicates a possible transfer mechanism through benthic organisms feeding on the bottom and, in turn, being fed upon by fish.

53.2 Response:

There is no doubt that transfer mechanisms do exist that facilitate bio-accumulation of PCBs. Feeding habits as well as geographical habitats of fish are known to change at different stages throughout their life cycles depending, of course, upon the species of fish being considered. Given the complexities of feeding habits and life cycles it is doubtful that a mobility vector for PCBS can be implied by observing only one food source in a species life cycle.

Additionally, as discussed in Section III, the PCB levels observed in Hudson River fish were related to extremely high, industrially released PCBs in the pool behind the dam at Troy, New York. Such a confined freshwater situation is not a good model for an open water marine situation.

53.3 Comment:

It could be pointed out in Paragraph 3.23, Page 37, that the bulk analyses of sediments to be dredged during the second increment of dredging (from the channel and several berthing areas) indicate values from two to three times higher than those of sediments dredged during the first increment.

53.3 Response:

See Response 25.8.

53.4 Comment:

We would not characterize some of the PCB values reported as "small," as stated in Paragraph 3.36, Page 47. Several samples from within the berthing area include values of 6, 7, 10.4, and 11 parts per million, respectively. While the long-term effects of concentrations of this level may not yet be fully understood, there is ample evidence that bio-magnification in fish and other animals has occurred and the problem must be recognized as serious until more is known. We would also question the source of the PCB contamination and whether the discharge has been halted.

53.4 Response:

It is recognized that bio-accumulation may be an ecological problem. However, PCB concentrations in sediment and water can be highly variable depending on proximity to sources of contamination. PCB's as well as DDT are known to concentrate in estuaries from such sources as surface water run off, industrial and municipal wastes, rainfall and accidental spills.

Paint systems previously used for ship maintenance at the NAVSUBASE are primarily responsible for the localized concentrations of PCB's observed in pierside sediments. Present paint systems used at the NAVSUBASE do not contain PCB's and past paint systems are no longer manufactured nor used at the NAVSUBASE.

Insulating fluid used in electrical transformers is a universal source of contamination. A Navy project (W040L) scheduled for completion in 1977 will seal gravel bases and provide curbing around all transformers and substations which will control and prevent accidental PCB spills from entering adjacent surface or ground water systems.

House Bill #5865 (State of Connecticut) has charged the State Department of Environmental Protection to establish a special commission to study the impacts associated with PCB contamination.

53.5 Comment:

This section is confusing. It states that friction velocities necessary to erode spoil material at the New London Dump Site are greater than those measured at the site (Page 70, Paragraph 3.62). However, on Page 69, Paragraph 3.59, it is stated that the spoil pile has undergone limited erosion, and the monitoring reports contained in Volume 3 of this supplement indicate that spoil material has been transported. Further, on Page 70, Paragraph 3.63, it is stated that some winnowing of fine material may have occurred; however, on Page 69, Paragraph 3.58, the opposite conclusion is drawn in discussing the occurrence of coarse deposits. These contradictory statements should be reconciled. Finally, Paragraph 3.64, Page 71, discusses the theoretical capacity of the New London dump site to accept spoil material. We would agree that this is entirely theoretical, since the remaining depth of 40 feet after all spoil material is placed equals the proposed river channel depth of the Corps of Engineers' project, conjuring up the possibility of having to conduct periodic maintenance dredging of the spoil pile.

53.5 Response:

As indicated in Section II of this volume, the SEIS discussions of velocity confused many readers. The general treatment given there provides background for the following observations.

The friction velocity described by Morton et al (ref. 140) is not in fact a measured velocity; rather it is a quantity characterizing the stress induced on the bottom by current velocities in the bottom boundary layer through the formula

$$u_* = \sqrt{\tau/\rho}$$

where τ is the Reynolds stress of the current and ρ is the density of sea water. The term friction velocity is derived from the fact that the units used to calculate the quantity result in a velocity. Examining the formula for u_* it is apparent that the Reynolds stress τ which is expressed as $\overline{\rho\, u'\, w'}$ in gm/cm^3 x cm^2/sec^2 is then divided by ρ in gm/cm^3 resulting in cm^2/sec^2. When the square root of this quantity is determined, the resulting units are that of velocity (cm^2/sec^2) and this parameter is given the name friction velocity.

53.5 Response continued:

The critical friction velocity u_{*0} needed to erode material is a function of the critical shear stress τ_0 which is primarily a function of the sediment characteristics and bottom roughness. This critical friction velocity for Thames River Dredge Spoil was determined from the data of Nacci et al (ref. 143). When the friction velocities determined at the dump site are greater than this value (3.96 cm/sec) then erosion will occur and we have dispersion; when the friction velocities are less than 3.96 cm/sec then we have containment or stable sediments.

It is important that current measurements taken at various heights above the bottom be converted to friction velocities before comparisons with other data are made. This can be done using the assumption of a logarithmic velocity profile above the bottom, however, caution should be used since previous work has indicated that this assumption is valid only 60% of the time. Using this assumption the mean current velocity (not friction velocity) at one meter above the bottom needed to erode sediment would be 72cm/sec (2.33 ft/sec) and 82.5 cm/sec (2.44 ft/sec) at 1.5 meters above the bottom.

As stated above the critical friction velocity is a function of both sediment type and bottom roughness. The values obtained by Nacci et al in the flume tank were of necessity over a smooth surface. When bottom roughness is present (specifically, large clumps of cohesive material in the case of the New London Dump Site) then this induces greater turbulence into the mean flow and the critical Reynolds' stress (τ_0) can be obtained at a lower mean current velocity. Thus, although the majority of the spoil pile may not be susceptible to erosion, winnowing of fine material can occur to a limited extent around the cohesive clumps and this in fact was observed by Morton et al (ref. 140) using underwater television and diver observations. However, this would not cause any major erosion of the spoil pile and should be of decreasing importance as the lag deposits of coarse material form a "cap" in the areas of highest turbulence.

It was possible during diving operations to distinguish between lag deposits of this type and coarse spoil deposits by digging into the bottom. If the coarse sediment changed to a fine silt below the surface layer then the coarse material was considered to be a lag deposit, if it remained coarse to some depth then it was considered to be the result of dumping. All of the lag deposits observed by NUSC divers were associated with the cohesive clumps of material.

In summary, no current measurements have yet been made that are larger than those required to erode sediment, hence we can conclude that in general the spoil pile is stable relative to tidal currents. However, in isolated instances where topographic features occur, there is sufficient turbulent energy to cause winnowing of fine material and produce a lag deposit of coarse sand. This winnowing does not constitute a major erosion of the spoils but rather a short term adjustment to the environment that should become even less important as the lag deposits form.

53.6 Comment:

Table 4-1 should be corrected to reflect the concern of the U.S. Fish and Wildlife Service for fish and wildlife resources and their habitats, not just the protection of surface waters.

53.6 Response:

The comment is noted and Table 4-1 has been amended to include these concerns.

53.7 Comment:

Table 4-1 and the text on Page 80 indicate awareness to the provisions of Section 106 of the Historic Preservation Act of 1966 with regard to concern for cultural resource protection. Further, it is indicated that the Connecticut Historical and Archeological Commission (s) are conducting field surveys to determine the probability of effects of their project on cultural resources. The results of these surveys should be discussed in the Environmental Impact Statement and should be given proper consideration prior to completion of a final project or selection of work procedure.

We note the Advisory Council on Historic Preservation is having an opportunity to review the subject material and anticipate that their reaction to the follow-up of these surveys will be similar.

We also recommend caution and possible reconsideration on the negative declaration regarding a preliminary field reconnaissance and examination of the National Register of Historic Places. The Federal Register, published Tuesday, February 10, 1976 (Vol. 41, No. 28), Part II, annual listing of the National Register of Historic Places, includes a Thames Shipyard in New London which appears to be on the river front in the area of increment two of the proposed project. This National Register consultation or examination determination should be strengthened by a commentary from the State Historic Preservation Officer which may well be contained in the results of current field investigations mentioned above.

As presented, we believe the statement is deficient insofar as its consideration of cultural resource protection is concerned; therefore, it is suggested that it be made adequate, in line with the above comments and response from the Advisory Council on Historic Preservation.

53.7 Response:

See Comments 63.0 and 64.0.

53.8 Comment:

There appears to be a discrepancy in Paragraph 5.65, Page 126, in that the Cornfield Shoals and Rhode Island Sound dump sites are noted as being containment sites, while Figure 6-21, Page 293, lists them as dispersal sites.

53.8 **Response:**

Cornfield Shoals is a dispersal Site and the Rhode Island Sound Site is a marginal containment site. The required corrections to the Figure and to Paragraph 5.65 have been made.

53.9 **Comment:**

Paragraph 5.73, Page 128a, states that in the long-term, dredging and disposal operations are expected to benefit commercial fisheries. We believe that this is much too broad a statement to make, given the unknown long-term effects of spoil disposal, plus the fact that sport and commercial fishing probably will have to be prohibited at the dump site.

53.9 **Response:**

Paragraph 5.73 should have indicated that the benefit would accrue to the River fisheries, not to fisheries as a whole. The Paragraph has been ammended in response to this comment.

53.10 **Comment:**

We have mixed feelings about this section (6). While we realize that comparisons have to be made in choosing alternatives, whatever they may be, it should be recognized that in the environmental field many factors are intangible and cannot be measured or described in precise, quantitative terms. Thus, judgements may vary between persons and/or agencies. Several paragraphs of the statement, such as Paragraphs 6.185, Page 235, and 6.362, Page 294, discuss these value judgements. However, other paragraphs appear to be contradictory and confusing, which lowers the credibility of this section. For instance, Paragraph 6.363 discusses retention ability of the various disposal sites and the relative ranking assigned to them. A preferred containment rating was given to the New London site, based partly on the wave-induced bottom velocity of 1.7 feet per second, which is stated as being as low as at many of the other containment sites discussed. However, Figure 6-21 indicates that this figure should be 0.6 fps, since the 1.7 fps figure is common to all sites.

Furthermore, Paragraphs 6.374 through 6.375 appear to use wave-induced bottom velocity and bottom tidal velocity figures interchangeably when, in fact, they are two separate values. This adds little credence in an attempt to rank alternate disposal sites.

53.10 **Response:**

The entirety of the ranking process by which New London was selected is judgmental in nature. The reason for presenting this process at length in the SEIS was to insure that the basis for the site rankings were clear. Only in this fashion can meaningful review of such a process be undertaken. The Navy presented its judgements in what was

53.10 Response continued:

hoped to be a clear and straightforward manner. In the discussions of velocity, however, more precise terminology would have enhanced this desired clarity.

In particular, the containment rating of New London was based on the monitored ability of the site to contain spoils, at least in the short term, and on a measured tidal bottom velocity of about 1.7 feet per second at 1 meter from the bottom. The storm-induced bottom velocity at New London was indeed 0.6 feet per/second. Confusion arose because of a limiting bottom velocity of 1.7 feet per second at a depth of 40 feet which was entered into Figure 6-21 for all sites in SSMO Zone 6. This provided the basis for the theoretical capacity calculation. Retention comparisons were based on measured and calculated bottom velocities, not on the velocity at a depth of 40 feet.

This same terminology confusion was apparent in paragraphs 6.374 and 6.375. In both of these the reference is to tidal velocities. Finally, further details of the tidal and storm-induced velocities are provided in Section IV of this volume.

53.11 Comment:

Paragraph 11.04 - Page 321 - We would like to add in this section that additional work proposed by the Navy could affect the disposal-site management situation, should these additional quantities of spoil material result in an actual or imminent violation of the criteria. Furthermore, it may well be the decision of the Corps of Engineers, based on recommendations from this agency, among others, that further spoiling at the New London site should not occur. This decision could be based on the fact that in view of the behavior of the material dumped to date, additional dumping of millions of cubic yards of spoil would constitute an unacceptable risk to the marine ecosystem in that area and a new dump site should be designated.

53.11 Response:

The comment is noted.

53.12 Comment:

Although an environmental impact statement cannot be expected to present information not available at the time of writing, we are aware of several reports concerning the proposed and alternate dump sites which should be available shortly. Upon request, we would be pleased to forward a list of these to you.

53.12 Response:

The reports alluded to are the Quarterly Monitoring Reports and the Final Report on East Hole. These were available during the preparation of the SEIS and, hence, were not requested from NMFS. These reports have since been made available to the Department of Interior.

54.0 STATE OF NEW YORK, DEPARTMENT OF ENVIRONMENTAL CONSERVATION

54.1 Comment:

Table 1-1, P. 6 - It is noted that the 5th, 6th and 7th Quarterly Reports, covering the sampling period of July 1975 - March 1976 have not been included in the Statement, although due dates for all three documents have passed. Since these reports include all Post-Dredging data, their findings regarding behavior of spoil for nearly a year (including the winter) after cessation of disposal may be extremely important. The Final Statement must include these reports.

54.1 Response:

See Response 13.3.

54.2 Comment:

We find the following points regarding the material to be dredged especially noteworthy:

a) Table 2-1, P. 19 - The total volume of material to be dredged by the Navy is reported at approximately 2.8 million cubic yards. When added to the 1.5 million cubic yards already dredged (1.14, P. 10), the total volume will exceed that reported in the original Final EIS by about 1.5 million cubic yards. The Final EIS (2.06d, P. 39) had indicated that the upriver or Phase 2 sediment was more polluted than the lower river sediment dredged in Phase 1.

b) Sec. 3.37, P. 47 - Sediments in the upper strata and in the vicinity of berthing areas have higher concentrations of contaminants than the lower strata and the Channel, respectively. Given the volume and chemical nature of the material to be dredged, we conclude that there is a significant possibility that adverse short and long term impacts may occur if the material is carelessly disposed of in the aquatic environment.

54.2 Response:

The comment is noted. As to paragraph (a) above, see Response 25.8, as to paragraph (b), careless disposal of these materials is not proposed and a monitoring study will be in force.

54.3 Comment:

Tables 3-4, 3-5, 3-6, P. 38 and ff - Sediment analyses indicate moderate to high levels of contaminant concentrations. In some cases, individual values are quite high. For example, PCB concentrations as high as 11 ppm are indicated; notwithstanding the statement in Sec. 3.36, this level of concentration is disturbingly high.

54.3 Response:

See Response 22.6.

54.4 Comment:

Sec. 3.47, P. 57 - This Agency has detected CS-137 and CS-134 in fish and aquatic vegetation from the vicinity of the New London Dump Site. Although we doubt that the dumping was responsible for our findings, we recommend that the Navy publish the minimum detectable levels of these isotopes in the sediments to be dredged in order to ascertain whether spoil disposal could be associated with out findings.

54.4 Response:

Fission products produced within the Naval Reactor Cores are retained within the fuel elements. The only radiation detected in the Thames River sediments resulting from the Naval Nuclear Propulsion Program are the small concentrations of Cobalt-60 described in paragraph 3.47 of the SEIS. However, small concentrations of Cesium-137 at levels which would be expected to have resulted from atmospheric weapons test fallout have been detected by the Environmental Protection Agency in the Thames River (0.1 to 0.4 pc/gram). In response to this question, a special analysis of two Thames River sediment samples was conducted with a minimum detectable level of 0.1 pc/gram for the two radionuclides in question. Cesium-134 was not above this minimum detectable level in either sample while in one sample, Cesium-137 was barely detectable at 0.16 pc/gram, consistent with the EPA results.

54.5 Comment:

Sec 3.60, P. 69 - It is noteworthy that disposal of the first 1.5 million cubic yards of spoil has resulted in establishment of an elliptical mound nearly one-half mile in length along the long axis. Moreover, this axis lies in a northwest-southeast direction, the same direction as the prevailing tidal currents. While unspecified in this section, bottom tidal currents for New London are reported in Table 6-21 (P. 293) at 1.7 ft/sec.

54.5 Response:

As noted in Section IV, the size, shape and location of the spoil pile have remained essentially unchanged in the past year. The elongation of the spoil pile is most probably due to the fact that the disposal bouy was moved to the southeast between December, 1974 and February, 1975. The influences of this are noted in Appendix K, pages 5 and 7 and is recorded on Figures K-4 and K-5. Thus, this elongation occurred during the disposal, over 16 months ago, not as a result of movement since that time.

250

54.6 <u>Comment</u>:

Sec. 4.18, Table 4-2, pp. 88, 89. New York statutes, plans, policies, and regulations are not included.

54.6 <u>Response</u>:

<u>The State of New York has no published regulations or policies regarding the disposal of dredged material</u>, in contrast to both Connecticut and Rhode Island, which have published such documents. New York is, at this time, cooperating with Connecticut and Rhode Island in developing a policy regarding dredging and spoil disposal in Long Island Sounds. Such a Tri-State policy is a much-to-be-sought condition, as it would greatly simplify meaningful consideration of State interest in decisions on dredging projects.

The New York water quality statutes and criteria are considered in Section 11 of the SEIS.

54.7 <u>Comment</u>:

Sec. 5.49, p.117. The Statement does not make clear to what extent the monitoring studies as conducted are capable at this time, or in the future, of detecting long-term impacts.

54.7 <u>Response</u>:

The initial monitoring period of two years was intended to monitor the immediate effects of disposal. Any further Navy disposal will be accompanied by monitoring, as well (Paragraph 1.08 SEIS). Only when a sufficiently long-term data base has been developed can definitive statements on long term impacts be made.

54.8. <u>Comment</u>:

New York State Water Quality Standards, adopted pursuant to P.L. 92-500, do consider oil in disposal of dredged sediments (6NYCRR, Part 701.5.6).

54.8 <u>Response</u>:

Paragraphs 5.05 and 5.55, as well as Tables 3-16 and 3-17, present the Navy's findings with regard to potential pollution by oil and grease.

54.8 Response continued:

In arriving at a permit decision the Corps of Engineers will consider all pertinent Federal and State standards with regard to water quality. See Section 11 of Volume I of the SEIS for further discussion of State water quality standards.

54.9 Comment:

Sec. 5.74, 5.75, p. 128a. In these sections, the Statement acknowledges that cumulative (long-term) effects upon Long Island Sound resources will occur from aquatic disposal of dredge spoil.

54.9 Response:

These two paragraphs should be taken in the context of ongoing clean up of pollution sources, as discussed in paragraph 5.76 of the Supplement.

54.10 Comment:

Table 6-1, p. 156. Available land-based disposal sites can accommodate approximately 1.4 million cubic yards of spoil, or about one-half the Navy's requirement. Rather than reject this alternative out of hand, on the basis of inadequate capacity, the Navy should seriously consider placing the most heavily contaminated sediments in these sites. As pointed out above, such sediments have been identified in surficial layers, particularly in berthing areas. It seems probable that sufficient landfill capacity exists to accommodate them.

If such disposal is conducted, caution must be exercised to prevent damage to wetlands or water quality. Careful location of sites, construction of containing walls, and design and operation of sluices should prevent these problems.

54.10 Response:

See Response 14.3. In addition, note that Comment 7.1 points out that the largest potential land disposal site (Hempstead Farms) will not be available for use by the Navy.

54.11 Comment:

Decisions on dump-site selection must be based on the best possible comparison of the impacts of using the various available sites. Since all of the environmental impacts, particularly long-term impacts, are imprecisely understood, the decision-making process must make

54.11 Comment continued:

allowance for probability. That is, all other conditions being equal, the appropriate dump site will be the one for which the possible impacts are least likely to occur. In this regard, three characteristics become most important:

a) The selected dump site should maximize containment of dumped spoil on a small area. In this manner, the least possible area of benthic activity will be directly or indirectly buried. Moreover, contaminants in the spoil will remain localized; their mobility into and through food chains will be most restricted.

b) The site should be located outside of estuarine areas. Since estuaries are the most biologically dynamic areas of the marine environment, biological productively and energy transfer through food chains are highest in these areas. Moreover, human harvest and consumption of estuarine dependent biological resources taken by recreational and commercial fisheries is more intensive than offshore fisheries. It is, therefore, unwise to introduce long-term cumulative pollutants such as chlorinated hydrocarbons and metals to the estuarine system. If a site must be located in an estuary, the lease biologically active areas of the estuary should be chosen for the same reason.

c) Use of the site for dumping should not restrict other preexisting uses. For example, areas important for commercial fisheries and navigation should not be chosen.

54.11 Response:

Each of these three points is considered at length in Section IV of this volume. Maximum relative containment was and is the most important ranking criteria for comparing possible disposal sites. Neither of the two sites under consideration is in an area which undergoes the large salinity changes usually characteristic of estuarine environments. The New London Site is, however, within Long Island Sound and is sometimes under the influence of the freshwater plume of the Thames River, especially on ebb tides and at high River flow levels, but it does not undergo large, regular salinity changes. It should also be noted that important commercial fisheries were considered in the SEIS. It has since been found that East Hole may actually be in a more valuable area than New London, in-so-far as the taking of fish and shellfish for human consumption is concerned.

54.12 Comment:

The (matrix) analysis has many faults, only a few of which are set fourth here:

a) Assignment of importance factors was totally subjective.

b) No provision was made for penalizing estuarine sites.

c) Certain of the parameters are inter-related, for example, "Biology," "Fishing," and "Other Uses" - "Regulatory."

d) In some cases, the assignments given simply are not justified by the data and discussion in the text.

54.12 Response:

There is no "objective" way to assign importance to non-quantifiable environmental elements. The weightings chosen favored environmental concerns heavily and are thought to be appropriate.

Section IV of this volume presents a re-examination of the criteria used in the original site comparison. No estuary penalization is applied; rather, the biological resources of the site and its surrounding area are disaggregated to show clearly the value of nearby areas. Biology and fishing are and were considered to be closely related. This recognizes both the simple value of the biologic resource and the economic value of the resource when harvested. As originally presented, and in the revised treatment, Other Uses and regulatory criteria are not inter-related. Other Uses considers human use of sites, while Regulatory Uses reflects the Federal and State interest in, and control over the sites.

54.13 Comment:

Containment - The Statement's conclusion that New London is the best containment site is simply incomprehensible. All comparative data denounces this finding.

The three predictive criteria which should be used to rate sites for containment are: sediment composition, bottom tidal current velocity, and depth (as it relates to wave-induced current velocity). We rate the best containment sites (from Fig. 6-22, p.310) as follows:

54.13 Comment continued:

SITE	SEDIMENT	CURRENT	DEPTH
1) East Hole	75% silt-clay in center	1.22 fps	170 ft.
2) Browns Ledge	silty sand	0.94 fps	110 ft.
3) Containment 2	silty-sand, pos. skew	1.7 fps	111 ft.
4) Containment 1	coarce silt, pos. skew	1 fps	65 ft.
5) New London	spoil, native unreported	1.7 fps	70 ft.

54.13 Response:

Sediments at East Hole, as discussed in Section IV of this volume, are not 75% silty clay. They are 75% sand. Native sediments at New London are about 60% sand/30% silt. Current velocities are discussed at length in Section IV, which shows that maximum velocities are similar at East Hole and New London. The use of depth alone is insufficient for retention. Storm wave calculations for New London and East Hole demonstrate that storm waves alone are generally insufficient to erode materials at either site.

Finally, the conclusion that New London was the best containment site took into account both its physical characteristics and the monitored stability of the spoils in place. No such monitoring is available for the other four sites listed.

54.14 Comment:

The Site Information Summary (Fig. 6-21, p. 293) misrepresented bottom sediment type at East Hole. That the central band of sediment, upon which dumping is most likely to occur, is 75% silt-clay (extremely fine-grained) is noted in Sec. 6.284 (2), p. 269.

54.14 Response:

See Section IV of this volume.

54.15 Comment:

Depth is more important in containment analysis than the Statement indicates. Large quantities of bottom sediment may be moved by short-term wave induced points during storms. The shallower the site, the higher the likelihood that such transport may occur.

54.15 Response:

Wave-induced transport is discussed at length in Section IV of this volume. Both depth and exposure to waves must be considered in estimating storm effects.

54.16 Comment:

Native sediments at New London are not reported. It is not surprising to learn that existing sediments are clayey silt, since it is known that 6 million cubic yards of spoil has been dumped there over the past 20 years.

54.16 Response:

It is indeed not surprising to find clayey silt sediments at the New London Site. This would be expected at a site with a long history of spoiling, especially if the spoils remained where they were dumped. In fact, it is this observation that led to the preference given to New London in the ranking for retention ability. Information on pre-disposal sediments at New London can be found in Exhibit J of the FEIS. These do show that, prior to disposal of Navy Phase 1 spoils, sediments within the disposal site had silt and clay contents of up to 60%, while a control station had 60% sand and only 30% silt and clay. Native sediments at and around the New London site have been further investigated by Dr. James Pauks of Lehigh University under contract to MACFC. His results are summarized in the 4th Quarterly Monitoring Report and showed that the sediments around the New London Site could be generally classified as fine to very fine, poorly-sorted sands. These results are discussed further in Section IV of this volume as are the records of and evidence of past disposal activity at New London.

54.17 Comment:

Biological Activity - Of the best containment sites described above, it is acknowledged by the Statement that East Hole is least active biologically. It must be emphasized that New London and Containment Site 1 (for which no benthic data are available), as estuarine areas, must be rated as highly undesirable. Brown's Ledge and Containment Site 2 appear to be biologically active offshore areas.

54.17 Response:

The SEIS discussed Brown's Ledge and Containment sites 1 and 2 in much the same terms as this comment. The fisheries at East Hole have been reevaluated in Section IV, as have benthic diversities. Taken together, these do not indicate that East Hole is without biological value.

54.18 Comment:

Other Uses - Containment Site 2 is in an important commercial trawling area while East Hole receives almost no commercial fishing use. In this respect East Hole also compares favorably with New London, which supports commercial lobstering and recreational fishing. In fact, the only reported use of East Hole is, "the periodic use of the BIFI acoustic range" (Sec. 6.291, p. 272). It is not stated whether this use would seriously conflict with spoil disposal at East Hole; we doubt it.

54.18 Response:

Commercial fishing at Containment Site 2 is discussed in paragraphs 6.257 and 6.258 in the SEIS. The commercial fishery at East Hole is re-evaluated in the light of new information in Section IV of this volume; it is more valuable than originally thought. As also indicated in Section IV, disposal at East Hole could be accomplished in conjunction with BIFI and FORACS Range use, but this would require scheduling and routing of barge paths to avoid conflicts.

54.19 Comment:

The type of dredging and disposal equipment to be used-Bucket dredging and bottom dump scows have been effective in minimizing spread of dredge spoils.

54.19 Response:

The comment is noted. This observation was made by the Navy in the FEIS and was the basis for the choice of equipment for the work at New London. For the same reasons, this same technique will be used in Phase 2 work.

54.20 Comment:

Establishment of dumping location - A point of dump within East Hole must be chosen. This point should be selected with input from commercial fishermen, the affected States, and scientists who have studied the area. Effective navigation control procedures must be established to assure accuracy of dump point location at sea.

54.20 Response:

Should disposal at East Hole be required, the final locations would be selected by the Army Corps of Engineers. The input from all interested parties would doubtless be considered. It should be noted, however, that precision disposal, discussed in Response 28.18, may be considerably more difficult at East Hole than at shallower sites.

54.21 Comment:

Pre-dump monitoring - The studies already conducted at East Hole should have been included in the Statement. In their absence we can only recommend that a lobster potting study be conducted, if one has not already been completed.

54.21 Response:

The Final Report on East Hole is presented in Appendix N. Currently, the Navy has no plans to conduct lobster potting studies there.

54.22 Comment:

During disposal monitoring - A monitoring program similar to that being conducted at New London should be implemented. This program should also include criteria whereby dumping can be halted if adverse short-term impacts are detected.

54.22 Response:

Any future Navy disposal efforts will be carefully monitored with the intent of providing information on short term effects. This was stated clearly in paragraph 1.08 of the SEIS. Present permit criteria comply with the comment.

54.23 Comment:

Special considerations - If lobster potting studies demonstrate unusually heavy use of the area (East Hole) by wintering resident lobsters (as has been found in some deep holes in this region), it may be necessary to conduct dumping operations during summer months. At temperatures below 5 degrees C, lobsters are inactive and cannot avoid burial.

54.23 Response:

The comment is noted.

54.24 **Comment:**

If polluted materials cannot be placed in land-based sites, consideration should be given to dredging polluted areas first. Later disposal of less-polluted sediment will tend to cap and seal the more polluted sediment previously dumped.

54.24 **Response:**

See Response 14.3 and 28.15.

55.0 *BUTZEL AND KASS LAW OFFICES*

55.1 Comment:

Rather than proceeding in the objective fashion that the Court directed, the Supplement has, with apparent intentional bias and bad faith, constructed a web of questional standards and then artificially bent and twisted the New London site to reach the conclusion that it is preferred.

55.1 Response:

The comment is noted. Contrary to the conclusions reached in the comment, the Navy, in accordance with existing law, and the Second Circuit Court's opinion as implemented by the Order of the Federal District Court for the District of Connecticut, has objectively evaluated the available information in good faith. The standards and analyses utilized are considered valid, rational and sound. (See Section 6 of this Supplement and Section IV of this Volume).

55.2 Comment:

.... the currents at East Hole are significantly less, in every important respect, than at New London. Furthermore, currents actually experienced at New London, as reported by the New York Ocean Science Laboratory, are in excess of those described in the Supplement as the velocities producing erosion of Thames River spoils. By contrast, the Supplement describes the bottom currents at East Hole as producing "friction velocities that are significantly less than those required to erode the spoil material." [Supplement, p. 270].

55.2 Response:

As demonstrated in Section IV of this volume, neither storm nor tidal currents at East Hole are significantly less than those at the New London site. Additionally, neither storm nor measured tidal currents at New London are sufficient to actively erode the materials. The quoted statement is equally true for New London. (see also Response 53.5)

55.3 Comment:

(The Supplement) places its emphasis on sediment characteristics, and on that basis classifies East Hole as only a "marginal containment site." Yet the sediment data themselves seem to support the containment nature of East Hole (being finely skewed, with gravel sized sediments encountered infrequently); and even more importantly, the sediments at New London were (and are) far more questionable as regards containment than at East Hole.

55.3 Response:

The sediments at East Hole and New London were only one of the factors considered in the original site rankings for retention. These sediments are discussed at greater length in Section IV of this volume. Considering surface sediments and current velocities, it can be concluded that East Hole and New London are physically similar. However, as pointed out in Response 33.4, the natural sediments at East Hole are more questionable concerning containment than those at New London. There is, moreover, monitored evidence of containment at New London, which demonstrates its good relative containment characteristics; such data are not available for East Hole.

55.4 Comment:

Thus, the Supplement notes at page 69 the presence of coarse sediments, including small gravel stones and other fragments, at New London -- a strong indication, on the basis of sediment characteristics, of significant movement and currents. Yet rather than taking these coarse materials as evidencing marginal containment at best, the Supplement speculates, without any supporting data, that "they may be coarse spoils, rather than a lag [remaining] deposit left from the winnowing [eroding] of fine [spoils]. (Supplement, p. 69). Were this not enough, when at a later page, a similar phenomenon is described at the Rhode Island Dumping Grounds [p. 297] -- there involving only sand, rather than gravel -the condition is used to categorize that location as a "marginal containment site", notwithstanding that the currents there are likewise lower than at New London.

55.4 Response:

The native sediments near the New London Site discussed in Section IV of this volume, are silty fine to very fine sands. Shell fragments and gravelsized sediments were found in several of the Thames River samples. It seems reasonable that, with no local source of coarse material, coarse dredge spoils would be the origin of the material observed at some location on the spoil pile.

The patterns of coarse material at the Rhode Island Sound Site were not patchy, but rather, they occurred in long, sinuous tongues. These might indicate either erosion at Rhode Island Sound or the movement of adjacent materials into the site.

55.5 Comment:

It appears that even within a year, 5% of the spoil, may have eroded... it is ludicrous for the Navy to rely on short-term containment -- even if it did exist -- as a basis for rating the retention character of the New London site. Rather, the retentive ability at New London should -- and on an objective basis, must be measured in the same way that it has been done for the other sites.

55.5 Response:

As pointed out in Response 13.1, the 5% accuracy of the spoil pile volume determination does not imply that 5% of the material may have eroded. Section IV of this volume provides a detailed discussion of the New London Site and East Hole. The monitoring data was considered pertinent and significant, and was used in the evaluation. Such monitoring data are considered a valuable tool in the prognostication of long term effects. The monitoring efforts discussed in Section IV demonstrate the relative containment properties for the New London Site after a winter storm season and a hurricane. No such demonstration can be made for the East Hole Site or any other site with no history of disposal.

55.6 Comment:

The currents at New London are clearly sufficient to effect erosion, and the nature of the coarse deposits there suggests exactly this result over the long-term. By contrast, the lower currents at East Hole do not reach the erosive level, and the finely skewed sediments suggest containment in fact. Therefore, it can only be concluded that East Hole has better retention capabilities than New London, and it must be rated as superior in this regard. Using the Navy's scale East Hole should be ranked first for retention, with New London given a "third" rating.

55.6 Response:

As shown in Section IV of this volume currents at the New London site are not "clearly sufficient to effect erosion". A comparison between New London and the East Hole tidal currents and storm currents (Section IV) does not indicate any clear preference for East Hole. Finally, sediment data at East Hole still leaves containment questions unanswered. If it is a containment site, it might not contain thin patchy sediments over glacial deposits.

On physical evidence, New London and East Hole are similar. But only has New London been monitored for its ability to contain spoils, even in the short-term.

55.7 Comment:

In the area of biology, East Hole and New London were both given first rankings, while for fishing, New London was ranked first and East Hole was given a second rating. Yet the Supplement acknowledges that species diversity was lower at East Hole and that fishing was non-existent there due to depths, etc. Under these circumstances, East Hole deserved at least equal and, in our view, a superior rating to New London.

55.7 Response:

As discussed in Section IV of this volume, a re-evaluation of fishing at East Hole supports a less desirable ranking than New London in terms of fishing. The benthic diversities of the two sites support a tie ranking for these sites and their environs.

55.8 Comment:

East Hole is given short shrift because of alleged "other uses" in the general area of the dump site. Yet nothing is said in the Supplement about how filling up part of the deep Hole would interfere with "periodic use" of the BIFI range; and as Mr. Gaillard has noted, it is inconceivable that appropriate scheduling could not avoid any conflicts. Under these circumstances, East Hole may deserve a lesser rating than New London, but certainly not the fourth ranking that has been assigned to it. Indeed there is strong basis for suggesting that this category should be dropped altogether, since it is believed any conflicts could be avoided through scheduling.

55.8 Response:

The use of the BIFI and FORACS ranges would cause scheduling and routing problems for spoil barges, as explained in Section IV of this volume. These conflicts could most probably be avoided by careful scheduling.

55.9 Comment:

The use of the "regulatory" criteria is, in our view, completely without merit.... If... East Hole is a superior site, the need to monitor conditions -- even if some added costs are involved -- cannot properly be used as a basis for not going there; otherwise, there would never be improvement in site selection.

Finally, as regards regulatory considerations, New London should itself be accorded a lower rating than assigned in the draft Supplement, due to the objection of Connecticut to the continued use of the site. Indeed, with the requirement for 401 certification, these objections may be insuperable; accordingly, as matters stand now, the ranking of New London should be lowered substantially.

55.9 Response:

Monitoring costs were not the basis for favoring New London over East Hole in the Regulatory ranking. These costs were used in the cost ranking and were assigned a weight of only 5%. The objections of Connecticut to the use of the New London Site have been noted, as have the objections of various fishermen's groups (Comments 50 and 51) and the State of Rhode Island (Comment 52) to the use of East Hole.

Under the provisions of Section 401 of the Water Pollution Control Act it is provided that no federal agency shall be deemed to be an applicant for the purposes of that subsection (Section 401 (a) (6)). Accordingly, certification from the State of Connecticut in connection with the current proposal is not required.

55.10 Comment:

The Navy's rating of ocean disposal sites was limited to the immediate areas of dumping. However, where, as here, the potential for sediment migration exists, attention should also have been accorded to possible impacts on neighboring areas.

In this regard, the New London site is clearly inferior; for it lies less than two miles from the rich nursery areas of the Connecticut-Long Island Sound shore. Thus, if the spoils, with their pollutants, move, they threaten serious impacts upon the productive and important coastal fisheries areas so nearby.

By contrast, East Hole is substantially more distant from coastal nursery areas. Accordingly, if spoils were to migrate from there, they would have much further to go before they could have any impact; and with the effects of greater dilution, the risk of damage would be significantly reduced as compared to the situation at New London. In short, the dangers of serious and widespread environmental impact would be substantially less if East Hole were used than if dumping were continued at New London.

55.10 Response:

The potential for sediment migration and its possible influences on coastal Connecticut are dealt with at length in Section IV of this volume. As was pointed out, there is no evidence of past movement from New London of the type of spoil deposited there. East Hole is certainly further from the coastline, but it, too, is near reproductive areas. There seems no sound basis for predicting that dispersion from East Hole would be more acceptable than such migration from New London.

55.11 Comment:

Taking account of the points noted above, and otherwise using the Navy's method of evaluation, the superiority of East Hole is clear. The following Site Evaluation Matrix follows the Navy's Model in Figure 6-22, with the following adjustments: Immediate Biology is reduced in importance to 10%, as are immediate Fishing and Other Uses. A new factor, covering Broader Impacts/Distance-Dilution, is added (reflecting the paragraph E considerations) and has been assigned a 20% weighting.

55.11 Comment continued:

SITE EVALUATION MATRIX 1 (including Other Uses)

Category	% Relative Weighting, Etc,	New London	East Hole
Retention	30/6	3/18	1/6
Capacity	5/1	3/3	2/2
Immediate Biology	10/2	2/4	1/2
Immediate Fishing	10/2	2/4	1/2
Other Uses	10/2	1/2	2/4
Regulatory*	10/2	2/4	3/6
Cost	5/1	1/1	2/2
Distance/Dilution	20/4	4/16	2/8
	Summation	18/52	14/32
	Rank Order	2/2	1/1

A second matrix is also set forth below,eliminating altogether the "Other Uses" Category, on the assumption that conflicts can be avoided through scheduling. The 10% factor (plus 5%, for a total of 35%), and Cost (plus 5% for a total of 10%).

SITE EVALUATION MATRIX 2 (excluding Other Uses)

Category	% Relative Weighting, Etc.	New London	East Hole
Retention	35/7	3/21	1/7
Capacity	5/1	3/3	2/2
Immediate Biology	10/2	2/4	1/2
Immediate Fishing	10/2	2/4	1/2
Regulatory*	10/2	2/4	3/6
Cost	10/2	1/2	2/4
Distance/Dilution	20/4	4/16	2/8
	Summation	17/54	12/31
	Rank Order	2/2	1/1

55.11 <u>Response:</u>

Section IV of this volume reconsiders the ranking process used in the Draft SEIS and applies those reconsiderations to a more detailed comparison of East Hole and New London. Many of these suggestions are incorporated for purposes of discussion, but the conclusions drawn still favor New London over East Hole.

55.12 <u>Comment:</u>

Since Federal action is required to "reinstate" the 404 permit for New London, and since permission for further dumping not previously considered is now being sought, the Navy must cbtain 401 certifications from Connecticut in connection with the current proposal, and the Corps cannot reinstate the permit or add to the disposal quantities absent such certification or waiver by State inaction.

55.12 <u>Response:</u>

See Response 55.9.

55.13 <u>Comment:</u>

At the Rhode Island Dumping Ground, where massive spoil disposal was undertaken between 1967 and 1971 [Table 6-7], shellfish contamination has been detected the last year or so [<u>Supplement</u>, pp. 116-117]. Long-term, therefore, the dumping of polluted sediments appears to involve serious risks.

55.13 <u>Response:</u>

A full discussion of the nature of possible shell fish contamination at the Rhode Island Sound Site is found in Section III of this volume. The "risk" is by no means confirmed and the spoils involved at the Rhode Island Sound Site are considerably more contaminated than those from New London. Thus, this comparison seems invalid.

55.14 Comment:

The Supplement cautions that fishing at disposal sites "should be discouraged" since the "extent of sources of contamination in organisms frequenting disposal sites have not yet been determined" [DS, p.125]. If even this short-term impact on fish is in such doubt, how can the Navy assert that there are no short-term adverse effects.

55.14 Response:

See Response 25.7

55.15 Comment:

It is not clearly stated in the Supplement that the spoil to be dredged in Phase II of the Navy project is significantly more polluted than the spoil from Phase I completed in 1975. Thus, the risks associated with proposed work are greater than those heretofore incurred.

55.15 Response:

The comparison between Phase I and Phase II spoils is made in Response 25.8.

55.16 Comment:

The Supplement indicates that ongoing studies on the long-term impacts of spoil disposal are "inconclusive" and will not be determined in the "near future" [Supplement, p. 127]. As long as this remains the case, however, and particularly in light of the experience in Rhode Island Sound, logic requires that risks be avoided to the greatest extent possible. This, as Dr. Bohlen long ago stated, is one of the prime reasons why dumping should not be undertaken at close-in sites, adjacent to coastal nursery areas, as is the case for New London, and should be moved to more distant (and much deeper) sites such as East Hole.

55.16 Response:

See Section IV of this volume for a discussion of the possibility of near shore effects. Section III also provides additional information on long-term effects. There seems to be no reason to assume that simple distance from the coastline is sufficient to insure against undesireable impacts nor to assume that disposal at East Hole would offer any significant advantage over disposal at New London; material lost from either site would probably be deposited in central Long Island Sound.

55.17 Comment:

The discussion of island building, which was specifically mentioned by the Second Circuit, remains inadequate. The analysis is conclusory and provides little detailed information. Costs, for example, are described as "very high", but nothing more is furnished to give a basis of judgement.

Of equal importance, the Navy's math seems to be questionable. Thus, It is stated that the construction of a containment structure in the Black Ledge area, with a 1.5 mile perimter, would hold only one million cubic yards of spoil. However, an island with 1.5 mile perimeter would have a surface area of approximately three-sixteenths (3/16) of a square mile, or 550,000 square yards. With spoil filled to a depth of 10 feet (which hardly seems very much), the containment would accommodate 5.5 million cubic yards, or, at a minimum, all projected spoil through 1985. With this potential, a much more thorough examination of island building should be undertaken.

55.17 Response:

As pointed out in Response 14.2, the full cost of building an island at Black Rock Ledge would add between $18,600,000 and $26,700,000 to the basic cost of dredging and disposal for the Navy effort. As also discussed there, the total capacity would be just under one million yards. Note that 10 feet times 550,000 square yards is 5.5 million feet-yards squared, or 1.8 million cubic yards. This volume is further reduced by the necessity for constructing a containment dike and by the irregular shape of Black Rock Ledge to about one million cubic yards.

55.18 Comment:

The Supplement makes much of the fact that the proposed dredging operations, and the introduction of the SSN 688 Class submarines, are expected to stimulate the local economy, including, through the "development and/or expansion of industries." This is probably so, and with the expansion are bound to follow a series of significant impacts on the human environment. Since the dredging will give rise to these "secondary" impacts, they must be considered and evaulated in the Supplement, in accordance with the CEQ guidelines.

55.18 Response:

See Response 45.1, paragraphs 5.71-5.76 and Appendix A of the SEIS.

55.19 Comment:

The Supplement describes the vast amounts of spoil destined for open-water disposal in the New London area (4.8 million cubic yards by 1980), but it never really addresses the cumulative impacts or risks of dumping so much spoil at the New London site. Furthermore, the Supplement takes no account of the precedential effects of dumping one increment on decisions regarding future increments. In fact, as evidenced by the Matrix analysis in the Supplement itself, the precedent may be close to conclusive; yet never is there a full scale analysis of the total dumping program, and the greatly increased risks that would follow from almost 5 million cubic yards of spoil sitting on the bottom. This is a major deficiency.

55.19 Response:

It is not proposed or known that all of the spoils discovered in the survey of Thames River dredging will be disposed of at New London. The SEIS addresses, to the extent possible, the known effects of these materials, should they be deposited at New London, in paragraphs 5.49 to 5.76 and in Section III of this volume. See also Apendix O of this volume.

55.20 Comment:

The Supplement states that the Corps of Engineers " for the past several years" has made an intensive effort to bring various agencies into agreement on the best location of dump sites in Long Island Sound [Supplement, p. 305].

Yet despite our urgings and the Corps' purported efforts, no regional assessment has even been initiated, much less completed. Over five million cubic yards of spoil will be dumped in the Sound at sites other than NLDG, yet there is and has been no apparent assessment of the long-term impacts of proposed dumping on the Sound as a whole and, the Navy admits, such impacts are still unknown.

Before government agencies and private interests nickle and dime the Sound to death, a broad assessment of the Sound should be researched, published and subject to public comment in accordance with NEPA. If the New London site is considered further, we believe such an assessment is a condition precedent to any selection of that site.

55.20 Response:

The comments are noted. The Navy does not agree that NEPA requires the broad assessment of disposal urged by the commentor. See Sierra Club v. Kleppe,_____ U.S. _____ (No. 75-552, 44 L.W. 5104, June 28, 1976).

55.21 Comment:

The elutriate test required by 40 CFR §230.4 has not been conducted. This is contrary to applicable legal requirements and must be cured before action can be taken with respect to reinstatement of the 404 permit.

55.21 Response:

The results of 82 elutriate tests performed on Thames River sediments are presented in paragraph 3.52. As indicated in paragraph 3.53 these samples were collected and analyzed in May and August of 1975. Interim final guidelines " to be applied in evaluating proposed discharge of dredged or fill material in navigable waters " were not effective until September 5, 1975 (see Appendix C, 40 CFR 230). These guidelines not having been implemented, and after referring to 33 CFR 209.120 and 33 CFR 209.145, paragraphs (g) 17 and (e)(i)(1) respectively, the elutriate tests were conducted in accordance with the procedures outlined in 40 CFR 227.

55.22 Comment:

Prior dumping at New London appears to be much less than previously asserted (See Table 6-7), and the continued claim that historically, 300,000 cubic yards of spoil have been dumped at New London annually [p.220] can no longer be sustained.

55.22 Response:

The Corps of Engineers entered into the record of NRDC et al. v. Callaway et al. (2nd Cir. No. 75-7048) as exhibit "D" detailed records of permitted dredge spoils directed to the New London site between 1958 and 1971. These records, presented in Section III, total nearly 3.4 million cubic yards of material, for a confirmed annual rate of just over 260,000 cubic yards per year. The entries in Table 6-7 illustrated one major project carried out before 1958 (a Coast Guard project in 1943) and the projects carried out since 1971. Thus, in the period from 1958 to 1975, about 5 million cubic yards of material were placed at New London, at an average rate of just under 300,000 cubic yards per year.

55.23 Comment:

The National Enviromental Policy Act was signed into law on January 1, 1970 and is sometimes referred to as the National Environmental Policy Act of 1969. The glossary reference to NEPA as the "National Enviromental Policy Act of 1968" is, regretfully, indicative of the respect that has been accorded the law in the draft Supplement.

55.23 Response:

This typographical error is noted and has been corrected.

56.0 AFFIDAVIT OF DR. FRANK BOHLEN DATED AUGUST 26, 1974 IN NRDC ET AL. v. CALLOWAY ET AL., SEPTEMBER, 1974

56.1 Comment:

The New London Dumping Ground lies in a relatively shallow basin, with a minimum depth of 35 feet and a maximum of only about 80 feet. This shallow bottom is washed continously by currents, oscilating generally with the tide, but having a net transport to the northwest into the Sound. The currents are of sufficient velocity that, given the shallow physical configuration of the site, dispersal of silt and sediments would normally be expected.

56.1 Response:

See Response 53.5 and Section IV of this volume.

56.2 Comment:

The Navy and the Corps, however, based on limited tests made in 1972, has claimed that some 97,000 cubic yards of spoil dumped at the site at that time did not move, and, holding this up as proof, assert that New London is a containment site. But this is to ignore, in addition to the physical configuration, two critical facts. In the first instance, the Navy's studies were limited to calm weather in July and August, when high energy currents are absent. By contrast, in stormy conditions which characterize the fall and winter, the currents will be much greater, and sediment transport under these conditions is, in my opinion, probable even in the early years.

56.2 Response:

Divers examined the spoil pile after a three-day Northeaster in October of 1975. They reported, that "No disruption of the spoil pile or its infauna by this storm is apparent." (MACFC, Fifth Quarterly Monitoring Report.)

Dr. Bohlen in Dehlinger, et al., (refs. 64, 65), mentions, concerning wind stress effects, "These mechanisms are most effective in the shallow water, along the coastal margin and within the Connecticut River. The depth and limited fetch conditions characteristic of the eastern Sound generally preclude the generation of long waves sufficient to erode materials in the open water areas."

Further data on these storm-induced waves, presented in Section IV of this volume provide further evidence that storm waves will not produce velocities high enough to erode material at New London.

56.3 Comment:

The second and even more critical factor ignored by the Navy and the Corps is that when dredged spoils are originally dumped, they are highly compacted and in many respects more like rock than mud. For this reason, dispersal seldom occurs, whatever the currents, in the months immediately following the dump. Thus it could hardly have been expected that the Navy studies made in 1972 would show movement. In time, however, the dredged spoils are broken down as they are populated with burrowing bottom creatures; and it is at this point, often after a year or more, that dispersal begins. In the case of the New London site, this is exactly what I believe will occur. In the first year there may be little movement, even in stormy conditions; but as time extends, given the shallowness of the site and the currents measured there, it is my opinion that there will by wide-spread dispersal even in regular currents.

56.3 Response:

There are two mechanisms by which benthic organisms could contribute to sediment erosion; instability of the tube mat or by suspension of sediment as a result of feeding activity. Washout of the tube mat has been reported in sediments which are coarser than those found at New London. (refs. 297 and 291) The sediments reported on were about 0.14 mm as compared to 0.0625 mm for New London sediments. In these the coarser sediments, washouts are attributed to alteration of the sediment texture by the incorporation of fine materials among the tubes, reducing the average size of surface sediments. The New London sediments are uniformly fine, well sorted and generally more stable for infaunal colonization.

Suspension of sediment by ampeliscids as a result of feeding will take place. However, the amount of material which is resuspended and subsequently transported from the site by currents is considered small. Feeding and reworking of sediment by the bivalve Yoldia limatula is also a potential source of bioturbation. However, the known densities of this organism in the region are low and it has not been reported on the spoil mound. Burrowing worms such as Nephtys incisa can rework the sediment to a certain degree. Larger organisms such as decapods and some demersal fish could also resuspend sediment. Some sediment will become part of fecal pellets which will settle faster than the parent sediment. The pellets can be eroded easier because they do not consolidate well. However, the idea that the sum total of fauna is going to rapidly aid in erosion of the spoil pile within a few years is grossly out of proportion. (See also Sections III and IV of this volume and Response 58.5)

56.4 Comment:

The consequences of dispersal of the polluted sediment cannot be predicted precisely, and there is always the chance that the impacts would be modest. However, the serious risks simply cannot be denied

56.4 Comment continued:

-- namely, the risk of long term and serious damage to the rich marine resources, including shellfish and finfish, that inhabit the site and the surrounding coastal areas.

56.4 Response:

Section IV of this volume considers this possibility in detail.

56.5 Comment:

The risks involved here are particularly serious for two reasons. The first of these is the sheer mass of polluted spoil that will be discharged -- 2,800,000 cubic yards, which is equivalent to a slab 300 feet wide, a mile long and 50 feet in height. As indicated, it is likely that this material will not disperse greatly within the first year or so. But once the dispersal begins, it will have massive amounts of spoil to feed it, and thus could spread over miles and miles of the Sound, carrying the pollutants with it and exposing an extremely large number of fish, shellfish and other marine organisms to them. And at this point, of course, there will be no way to stop it.

56.5 Response:

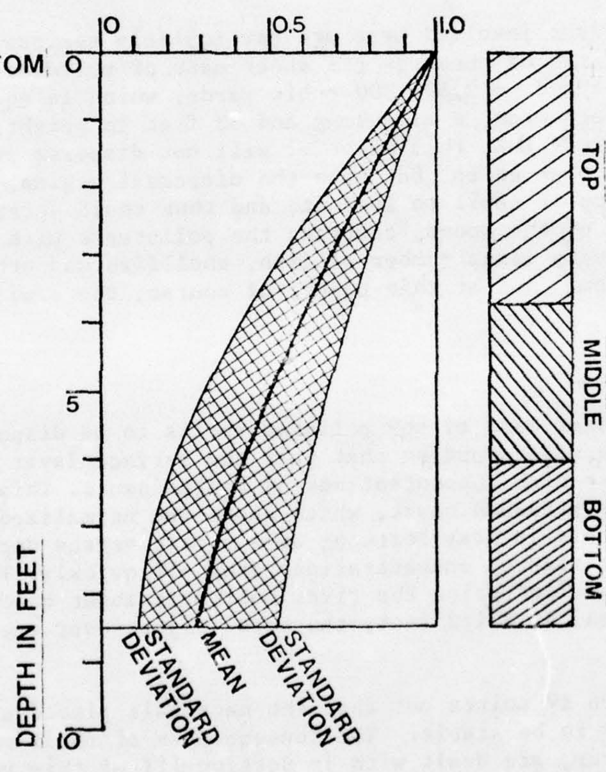
The sheer mass of the polluted spoils to be disposed of must be tempered by the understanding that only the surface layer of the materials exhibit high concentrations of contaminants. This is illustrated in the attached chart, which shows the normalized average concentration of metals in Navy berthing area spoils versus depth. As can be seen on the figure, concentrations drop off quickly. The mean concentration at five feet below the river bottom is about half of the surface concentration. At 8 1/2 feet, the mean is just over one fourth of the surface value.

Section IV points out that the materials placed at New London to date appear to be stable. The consequences of their movement, should it occur, are dealt with in Section III of this volume.

56.6 Comment:

The second factor which makes the risks so serious is the proximity of the site to what can only be described as a rich coastal fishery. This includes, in the first instance, shellfish, such as lobsters, clams and mussels, that dwell in and around the site itself, and a variety of finfish that populate this general area of the Sound. But beyond the immediate inhabitants, there lies only a mile and a half away -- and in the direction that the sediments would be expected

THAMES RIVER SEDIMENTS
AVERAGE VARIATION
METALS vs DEPTH



56.6 Comment continued:

to be carried -- the spawning and nursery areas of the Connecticut coast. These areas are, of course, critical not merely to the health and survival of local populations, but, as a result of migration to far broader reaches of the Sound and even the outlying ocean. Thus, any serious risk of damage should, in my, opinion, be avoided if at all possible.

56.6 Response:

See Section III and IV of this volume. It appears that the risks of material movement from the East Hole Site may be as severe as the risks associated with movement from the New London Site. It also appears that the ultimate fate of material moving from either site would be the same; it would be deposited in central Long Island Sound, not in nearshore waters.

56.7 Comment:

In my judgement, there can be no question that in time, the polluted sediments dumped at New London will be dispersed over a far broader area, moving along the bottom and in some instances, becoming suspended in the water column. This, in turn, will pose particular dangers to the many benthic (or bottom-dwelling and feeding) species found in the surrounding waters, including lobster and flounder, and also to the filter-feeding shellfish. The ingestion of the polluted elements, either directly or through the steps of the food chain, could well lead to increased disease in such organisms; and the large-scale intrusion of the spoils into the nearby coastal areas could have a major adverse impact on the continued viability of life there. All of this, admittedly, cannot be shown as inevitable. But to take such risks with so much spoil involved and in an area so near to the shore makes little sense unless there are simply no alternatives.

56.7 Response:

As shown in Section IV, major movement of the material at New London has not been observed after a winter storm season and a hurricane. The possibility of long term effects from the disposal operation is discussed in Section III of this volume. One of the purposes of the Draft SEIS was to explore alternatives to open water disposal and alternative sites for open water disposal. These considerations are further expanded in Section IV of this volume.

56.8 Comment:

Such is not the case here. Better alternative sites do exist. Specifically, the Navy and the Corps, at one time or another, have themselves identified and/or suggested (A) a location 10 miles

56.8 Comment continued:

southeast of Block Island, and (B) two others south and east of Fishers Island. Each of these sites is quite deep, and each appears to meet the criteria of a containment site. By contrast, the New London Dumping Ground clearly is not a containment site.

The additional virtue of these alternative sites lies in their location farther from important coastal areas than the New London site, and in the theory of dilution by distance. Thus, while, because of containment characteristics, the polluted spoils are unlikely to move from these sites, even if they should, the sites are so much more remote from the coast that the spoil would have far greater opportunity to dissipate before reaching coastal resources, marine fisheries and the like. This, in turn, would mean less of an impact upon important nursery and spawning grounds, and thus less risk to the life supported in these areas, than is the case with the New London site. In short, by abandoning the New London Dumping Ground, and choosing a true containment site further removed from coastal areas, we can greatly increase the odds of protecting the environment, and greatly reduce the risks being taken now.

56.8 Response:

All three sites mentioned by Dr. Bohlen were considered in the SEIS (See Section 6 of Volume I). Upon analysis, the proposed New London Site ranked highest in containment qualities (See also Section IV of this volume).

56.9 Comment:

I should also emphasize that the monitoring program proposed by the Navy here offers little, if any, protection against the risks. This is the case in the first instance because the monitoring is directed to short-term impacts only, and will leave long-term effects undetected. But beyond this, even if the monitoring were long-term, it would probably be of little assistance.

56.9 Response:

One of the purposes of the Navy monitoring effort is to detect adverse short term effects of dredging and disposal operations (See FEIS paragraph 1.16). Other than local burial of organisms, no such effects have been detected. Further, monitoring dependent upon continued disposal could expand the already available 2 1/2 years of data to approximately 5 years. This could serve as the beginnings of a long term data base. No monitoring effort can correct observed effects, but only by such monitoring efforts can such effects be detected should they occur. This provides both an identification of effects at a particular site and adds to the scientific data base on the effects of dredge material disposal generically. Such can hardly be characterized as "of little assistance".

56.10 Comment:

Finally, it is my opinion that the Navy and the Corps, after establishing the proper standard in seeking a containment site, completely departed from that standard -for reasons political perhaps, but in no respect environmental -- when they selected the New London Dumping Ground.

56.10 Response:

The Navy's studies of alternatives in the Draft SEIS, as mandated by order of the Federal Court, indicate that the New London site is the preferred choice on environmental grounds. The ultimate site determination will be made by the Corps of Engineers pursuant to its responsibilities under the Federal Water Pollution Control Act.

57.0 <u>AFFIDAVIT OF HOWARD MICHAEL WEISS, DATED AUGUST 16, 1974 IN NRDC ET AL. v. CALLOWAY ET AL., SEPTEMBER, 1974.</u>

57.1 <u>Comment</u>:

In a number of places, the bottom of the Thames River is also rich in hydrogen disulfide, indicating anaerobic (or oxygen poor) mud and bottom conditions. As a result, the diversity of marine organisms living in the bottom muds of the river is much lower than those found in more oxygen rich muds farther out in Long Island Sound.

57.1 <u>Response</u>:

Agr ement is expressed with the observation of oxygen conditions in the sediments in the River and Long Island Sound. However, if the comment attempts to suggest that disposal of dredge spoil will force anoxic conditions on Long Island Sound, it is not supported by monitoring. Once exposed to oxygenated water, the redox potential will change and sulfides will be oxidized. See Section III of this volume for a full discussion of both aerobic and anaerobic processes affecting chemical releases.

57.2 <u>Comment</u>:

Both my personal bathymetry and the Navy's limited studies (NAVOCEANO TECHNOTE 7300-3-73, set forth as Exhibit J to the Final Impact Statement) show very clearly that the dump site is a relatively shallow basin, with a depth of only 35 feet at one point and a maximum depth of only 80 feet. Overall, about one-third of the site is shallower than 65 feet, and this means the deposited silt will not be at great depths.

57.2 <u>Response</u>:

The question of depth of the site including detailed recent bathymetry measurements of the spoil pile are presented in Section IV. These show that the disposal has taken place in the deeper portions of the site.

57.3 <u>Comment</u>:

My personal observations of the dump site (as well as the Navy's technote) reveal that the site is subjected to significant currents, which at varying phases of the tidal cycle, flow towards Niantic Bay, the New London shoreline (including Ocean Beach State Park), the Thames River, the State Park at Bluff Point, Groton and, one mile to the east, Fishers Island. Areas affected by the currents flowing across the dump site also include, as I have previously indicated, many valuable coastal resouces, as well as marine fisheries (lobster, flounder, etc.) and sport fishing areas (e.g., bluefish and striped bass).

57.3 Response:

Section IV of this volume deals at length with the currents at New London. Section III deals with possible long-term effects.

57.4 Comment:

Studies elsewhere have shown that storm conditions generate the bulk of sediment transport likely to occur within a year. I would expect that in similar storm conditions in the New London site there would be significant movement of the polluted sediments beyond the site and into valuable coastal areas. In this particular instance, moreover, given the exposed nature of the dump site, the normal low energy currents may also be capable of conveying the polluted dredged spoils on a regular basis into the coastal areas and ultimately further into Long Island Sound, reflecting the westerly nature of the daily residual drift (net current effect). Additionally, since the dump site is located close to areas of extremely high energy currents such as the Race (about 5.2 knots), even further dispersal may be likely.

57.4 Response:

A detailed treatment of storm waves and possible dispersal routes is given in Section IV of this volume.

57.5 Comment:

There is no reason to assume that catastrophic environmental consequences such as massive fish kills will result from dumping at the New London site -- over the short term. The greater concern, and real danger, lies in the long-term exposure of marine organisms to the polluted dredge spoils, particularly if, as is likely, dispersal of these materials occurs.

57.5 Response:

See Section III of this volume.

57.6 Comment:

One potential long-term consequence of the dumping is heavy metal uptake by successive links in the food chain. Studies indicate that heavy metals such as those admittedly present in the Thames River sediments are taken up by marine organisms and concentrated at each successive link in the food chain, resulting in contamination and the depletion of healthful resources.

57.6 Response:

See Section III of this volume.

57.7 Comment:

In addition, the presence of coliforms in the Thames River bottom muds could indicate pathogenic organisms (bacteria and viruses) to which fish and shellfish may be susceptible. In this connection it should be noted that while shellfish are found living in the Thames River, the harvesting and consumption of these creatures from the River are prohibited because of the pathogenic bacteria which are present and which constitute a health hazard to humans.

57.7 Response:

The comment is noted. See also paragraph 5.59 of the SEIS.

57.8 Comment:

It also bears noting that environmental inpacts are synergistic and cumulative in their effect -- a factor that has been ignored by the Navy, which takes the dumping as if it were to occur in a vacuum. But there are other sources of pollution around, such as industrial effluents, municipal wastes and, all too likely, future dumping of additional dredged spoil; and when the magnitude of the New London dumping is considered in conjunction with these others, it may well be that the overall harm will be seriously compounded. This, however, has simply not been addressed.

57.8 Response:

See paragraphs 5.49 through 5.76 of the SEIS.

57.9 Comment:

I also note that the monitoring program that has recently been approved offers very little in the way of protection. Aside from the ambiguousness of the criteria for measuring effects, the more pertinent fact is that the monitoring program is of such a limited and short-term nature that it is very unlikely to uncover any long-range detriments, and seems designed to detect only catastrophic near-term consequences. At best, I fear, it will simply record history; and when the damage is done, it will already be too late.

57.9 Response:

See Response 56.9. The Navy intends to continue monitoring activities at whatever site is designated for disposal, as is stated in Paragraph 1.08 of the SEIS.

58.0 TESTIMONY OF WALTER FRANK BOHLEN IN NRDC ET AL. V. CALLOWAY ET AL. SEPTEMBER 12, 1974

58.1 Comment:

I believe that the primary emphasis [on criteria for site selection in the FEIS, December 1973] was placed on the current measurements, with secondary emphasis placed on the sediment characteristics and distributions as determined by samples of the sediment in the vicinity of the disposal site.

58.1 Response:

The criteria list used in site selection in the SEIS was considerably expanded from that used in the FEIS, partly as a result of this comment.

58.2 Comment:

Our present state of the knowledge of the effects of spoils disposal on coastal waters is simply not sufficient to say we can allow them to disperse. If we're going to deposit them we want them to stay put. We want to contain them.

58.2 Response:

The relative containment ability of the various alternative sites was the most heavily weighted criteria used in the SEIS.

58.3 Comment:

In an area like Eastern Long Island Sound, a high energy area that can only be characterized as a high energy area, materials out to a depth of 60 feet, 60 to 80 feet, move regularly in response to these two parameters [wind stress and river discharge].

Now, in the area of the Thames River site the discharge from the river, from the Thames River, is of secondary importance. Materials in the area are suspended, resuspended primarily under the effects of wind. As a result, if one goes out and samples concentrations of suspended material they will find that there is a regular yearly variation in the concentration that march along very nicely with the yearly variation in the winds. We have yearly cycles in winds in the Eastern Sound.

So, I can only conclude that in the area inside Fisher's Island Sound there are basically no containment sites. The material at any site in Fisher's Island Sound will move.

58.3 Response:

The New London Site is near the mouth of Fishers Island Sound, but does seem to offer good relative containment properties, as indicated by the results presented in Section IV of this volume. Wind induced currents are considered in great detail in Section IV of this volume.

58.4 Comment:

Material suspended over, or resuspended over the site (New London) can only move in response to the net drift as characteristic of the area - and that has already been testified to be to the northwest.....

The northwest contains a variety of fairly fertile spawning and nursery grounds, estuaries. The Jordan Cove area, the Niantic Bay area, further off down to the west the beginnings of the Connecticut River estuary area....

Some fraction of the spoils would move into these areas, yes.

58.4 Response:

As pointed out in Section IV of this volume, results from recent current meter studies indicate that net drift may be to the east-southeast. In any event, material movement as far as the mouth of the Connecticut River doesn't seem to be a realistic possibility, especially in light of the post-1974 bathymetry at New London.

58.5 Comment:

Once the material is on the bottom (at the disposal site), the initial movement during the first year or so I would imagine to be very slight. This is because of the character of the spoils and the biological composition of the spoils; the burrowing worms, clams, and so forth. There's a very low population of burrowing critters in the lower Thames spoils. As a result, the materials remain relatively cohesive and stay together, stay in one place....

I say the breakup of the spoils probably wouldn't be noticeable, measureable probably in excess of a year, maybe a couple of years.

I don't want to picture the erosion of the spoils as anything that will be catastrophic. This will be a slow, long-term process. The spoils would be eroded slowly. So that the spoil pile should be pictured as being a persistent source of materials.

58.5 Response:

See Section III of this Volume for a full discussion of this possibility. Bio-stabilization seems as likely at New London as Bio-turbation. See also Section IV of this volume for a discussion of the likely deposition of the spoil should any transport occur.

58.6 Comment:

....the erosion of a block of polluted spoils presents to the water column a variety of pollutants that are contained, absorbed on the suspended materials. Those materials, in general, are ingested by filter feeding organisms...such as clams and mussels. They feed on the filtered materials from the water column. The materials can be taken up and concentrated at the tissue level in the organism. So that there are hazards in presenting to a filter feeding population a variety, a ready supply of polluted spoils.

....the area is rich in forage feeders; that is, the lobsters and the flounder - both feeding down on the sediments, near the sediments.

If the sediments are polluted, certainly elements of that pollution will be taken up by the lobsters and the various forage feeders; crabs, lobsters, and flounder. There have been instances...of gill disease in flounder, shell disease in lobsters and crabs in the areas where they are exposed to polluted spoil.

That's a variety of spoils; it's not only dredge spoils, but industrial waste.

So presenting to an area that is rich in biological life an abundance of polluted spoils makes poor management sense. It's an unnecessary risk.

58.6 Response:

Section III of this volume discusses the potential and observed bio-accumulation of materials from the Thames River sediments. Monitoring of heavy metals in one forage feeder (lobsters) inhabiting the material at the New London Site has not shown any accumulation of these elements.

58.7 Comment:

This is an area that is a rich recreational area, that is essential to the economic health of Connecticut and the adjoining states. To hazard the recreational characteristics of the area because of placement of the spoils, if it's not entirely necessary, I also believe is an unnecessary risk.

58.7 Response:

Paragraphs 5.74 to 5.76 in the SEIS discussed this potential. There seems to be no measureable hazard to the recreational use of the area. See also Section IV of this volume.

58.8 Comment:

In my opinion, there are a number of other sites that could be used to significantly reduce the probability of environmental damage... If I approached the problem from the standpoint of an oceanographer that's concerned with the transport characteristics of the site and ...in particular if I am asked to select a site that is, as far as possible, a containment site, then I would have to say that...there are two attributes that I would look for. One is depth...

There are two sites off of Fishers Island that are being considered right now, either one of which would probably serve more nearly [than New London as] a containment site. One is there's a 325 foot hole [West Hole] ...and...a site that is slightly to the east of that. It is about 188 feet in depth...[East Hole].

The other [Criterion] that I would have to go for is that to reduce as far as possible the probability of significant environmental impact in the near shore areas is distance; get as far away from the near shore areas as we can.

58.8 Response:

West Hole was considered in some detail in paragraphs 6.275 through 6.281 of the SEIS. It was rated as a dispersal site, rather than as a relative containment site and dropped from active consideration as an alternative. East Hole was discussed in paragraphs 6.282 through 6.292 of the SEIS and is further considered in Section IV of this volume. As pointed out in Section IV, simple distance is not a sufficient condition to insure against adverse effects from dredged material disposal and under specific conditions, such as in the present instance may not even be pertinent.

58.9 Comment:

...you have to be able to characterize not only the mean velocity (of currents at a site), but the turbulent structure of the flow...the more turbulent the flow is the more likely the stream is to erode and suspend the materials. The turbulent structure of the flow is governed largely by the surface waves.

58.9 Response:

Paragraphs 6.95 through 6.99 of the SEIS considered the influence of surface waves on bottom velocities at all of the alternative sites. A more detailed treatment of this phenomenon has been provided for East Hole and the New London Site in Section IV of this volume.

58.10 Comment:

If the risk that I've been describing can be characterized as long term subtle effects, I don't believe that the monitoring program will be able to detail those, or to protect against those sort of subtle impacts.

58.10 Response:

See Response 56.9

58.11 Comment:

In addition to the difficulty of being able to predict the movement of the sediment, there is a time lapse problem involved...I do not believe that the sediments will move catastrophically, that there'll be large volumes of movement of sediments.

58.11 Response:

See Section IV for a discussion of sediment movement at New London over the past year and a half. No significant movement has been observed, even after a winter storm season and a hurricane.

58.12 Comment:

The longest bloc of data (on long term effects of dredged material disposal) that I'm familiar with -- there are probably longer blocs of data available over the New York Bight off New York Harbor -- but the longest bloc of data that I'm familiar with is in Saila's work in Narragansett Bay, and that's something on the order of six to eight years of data. These data have shown a general gradual recolonization of the spoil and some winnowing of the surface materials.

58.12 Response:

The work of Saila (ref. 183) at the Rhode Island Sound Site was used extensively in the preparation of the SEIS. Both recolonization and some winnowing (a localized phenomenon) have been confirmed at that site. See also paragraphs 6.211 through 6.221 in the SEIS.

59.0 WALTER FRANK BOHLEN, PhD, UNIVERSITY OF CONNECTICUT, MARINE SCIENCES INSTITUTE

59.1 Comment:

I am particularly concerned with the physical transport characteristic of the New London Site, If if is our intention to select disposal areas that will maximize the probability of containment, then clearly this location is unacceptable. The area, in common with most of eastern Long Island Sound, is affected by high velocity tidal currents. The laboratory data referenced in the Supplement indicate that these velocities alone are very nearly sufficient to erode the undisturbed cohesive spoils. The probability of such erosion at the New London Site, however, is significantly higher that at several of the alternate sites, since its shallow depth increases its exposure to additional wind-wave induced currents. This combination of a high energy tidal stream and aperiodic storm events operating in relatively shallow water must be expected to produce a slow, persistent erosion of the spoils pile. Such erosion will typically display significant temporal variability with a marked dependence on a variety of biological factors (burrowing, binding, etc.)

59.1 Response:

The New London site is considered acceptable in terms of material transport. Recent bathymetric measurements (Response 13.2) show that no significant change in the shape or location of the spoil pile has occurred in the past year. Further, maximum tidal currents measured at New London are on the order of 60 cm/sec (2 ft./sec), measured at 1 to 1.5 meters from the bottom. The erosion velocity of Thames River sediments is 52.5 cm/sec (1.72 ft/sec), measured at 15.25 cm (6 in.) from the bottom. As demonstrated in Section II of this volume, this corresponds to a velocity of 71 to 74 cm/sec (2.33 to 2.44 ft/sec) second at 1 to 1.5 meters from the bottom; measured tidal currents are not sufficient to erode the material. Storm-induced bottom currents are dealt with at length in Section IV of this volume. These currents, too, are insufficient under all but the rarest conditions to cause erosion of Thames River sediments. Finally, biological factors (particularly the benthic community now recolonizing New London) may be more likely to cause binding of the surface sediments rather than enhancing erosion potential (See Section III of this volume).

59.2 Comment:

On at least two occasions, turbidity level downstream of the spoils pile were observed to be higher than those upstream; TV observations reveal "easily disturbed" fluidized layers at the sediment-water interface indicative of active bioturbidation; bathymetric surveys following the '75 - '76 winter season reportedly indicate continuing reduction

59.2 Comment continued:

in the total volume of spoils present at the site, while diver's observations indicate a general rearrangement and smoothing of surface features of the pile. There is clearly a high probability that materials dumped at the New London grounds will be subject to measurable erosion and subsequent transport.

59.2 Response:

These turbidity measurements were based on transmissometer readings which were calibrated with in-situ suspended sediment samples. Based on conversations with Dr. Rudolph Hollman at NYOSL, correlations of such readings are often times tenuous. Additionally the transmissometer was moved to measure turbidity levels at various points on or near the spoil pile, thereby ruling out simultaneous measurements of the upstream and downstream values. He cautions that although increases in turbidity were noted, the results may not be reproducible (personal communication).

Additionally, communication from Dr. E. N. Jones, at NUSC, pointed out that the accuracy of the instrument used is about 3% of T at T = 75%, that the wire weight attached to the transmissometer could have influenced the readings, that the calibration of the transmissometer depends on the sediment size being measured (which was not done in all cases), and that the time difference between measurements (up to one hour) makes comparisons difficult. These points, taken together, indicate that the observed differences in transmissivity (2-5%) are not a reliable indication of scour. See Section IV of this volume for a complete discussion of bathymetric survey results. For a discussion of diver's observations, see Response 53.5.

59.3 Comment:

The most recent current meter observations suggest a net, near-bottom drift to the east/southeast. Unfortunately, these data are difficult to reconcile with the majority of drifter data. It seems likely that the indicated drift is an artifact produced by point sampling a spatially variant velocity field. Until this point is resolved, one must be satisfied with the prediction that the preferred transport route is somewhere along the northwest-southeast line.

59.3 Response:

There are two different types of current measurements involved here; an Eulerian measurement where direction and speed are measured at fixed points and a Lagrangian measurement where the path of a water particle is traced over a long period. The drifter data (Lagrangian) indicate only the final result of current motion and cannot give a detailed picture of flow within the current field. On the other hand the current meter (Eulerian) data indicate motion only at one point or a series of points and cannot predict the net transport of water once it has left the measurement area.

AD-A031 434 NAVAL FACILITIES ENGINEERING COMMAND PHILADELPHIA PA --ETC F/G 13/2
FINAL ENVIRONMENTAL IMPACT STATEMENT, DREDGE RIVER CHANNEL: NAV--ETC(
SEP 76

UNCLASSIFIED NL

4 OF 6
AD
A031434

59.3 Response continued:

The data from the current meters are most significant when discussing the question of spoil pile stability as they give a direct indication of the velocities at a point where erosion might occur and the initial direction of transport. When an array of current meters is used, as was the case at New London and East Hole, then a perception of the overall current field can be obtained from the Eulerian measurements. In the case of New London, the Eulerian current data revealed a net drift to the east and southeast indicating the possibility of transport into the race. This was confirmed by measurements of Holman (5th Quarterly Report) on an ebb tide when his drogue passed through the Race into Block Island Sound. Once in the vicinity of the Race, the net bottom drift is westward into Long Island Sound. Therefore, drifter studies that show only the final result of net drift would indicate westward transport even though the initial motion at the disposal site might be eastward.

Secondly, although the net (non-tidal) drift may be on the order of 7-8 cm/sec, the actual velocities (tidal) encountered are on the order of 30-40 cm/sec which means that material that had been eroded (or a drifter) would be carried a significant distance (on the order of miles) during a given tidal cycle. Thus, a drifter that was released during a flood tide might be carried to shore in the northwest direction during one flood cycle or conversely, to Block Island Sound on one ebb cycle.

Since such large distances are involved it is doubtful whether the concept of net-drift is particularly relevant to the question. The most important aspect is whether or not the currents are of sufficient strength to cause erosion. If the spoil were to be eroded the dispersal effect associated with transporting the material several miles would make observation or even detection of spoil material at these distances nearly impossible.

If erosion were to occur it would seem that the only effect that could be observed would be transportation by saltation in the bed load. Once there is sufficient energy to erode a fine particle and place it in suspension much less energy is required to keep it in suspension. Thus, in a tidal flow even as the tidal current becomes slack and erosion ceases, transportation continues and particles are carried large distances. However, with saltation the particles are rolled or bounced along the sea floor and once the current velocity is below the critical erosion velocity for a given particle it will remain in place. This would then result in an elongation of the spoil pile in the direction of tidal flow and probably mostly in the direction of net drift. No elongation due to this effect has been observed at the New London Disposal Site.

59.4 Comment:

In the absence of accurate quantitative estimates of sediment transport routes and rates, estimates of biological impact must depend primarily on field observations. Unfortunately, the available data set is extremely limited, and primarily suited for estimations of acute or short-term impact. These have never been the primary concern. Rather, it has been, and remains, the extent of the long-term, or chronic impact. As stated in the Supplement, present evaluations of these impacts are at best, speculative. However, given the nature of the spoils and the local biological community, I would argue that the clear probability of sediment movement at the New London site discussed above tends to increase the probability of significant long-term impacts. As a result, continued use of this site may well represent unnecessary gambling with the viability of the marine resource. Unnecessary, since there are several other nearby locations where the probability of long-term impact is significantly lower than at the New London Site.

59.4 Response:

See Sections III and IV of this volume.

59.5 Comment:

In your review I trust you will take the above comments into consideration. I believe that an objective reading of the Supplement and associated data will tend to support them as well as indicating that several of the alternate sites are, in fact, superior to the New London Site in all respects except cost. The minor increase in project cost seems more than justified given the value of marine resources in the eastern Sound.

59.5 Response:

The Supplement gave very little weight to cost. The sensitivity analysis displayed in Table 6-11 shows that the relative ranking of open water containment sites remained the same when cost was completely eliminated. The incremental costs of going to the Munitions Dump Site would be significant and worthy of consideration in any final decision. As Table 6-11 demonstrates, assignment of a heavy weight to cost drove the Munitions Dump Site from third place in ranking, to last. It should also be noted that disposal at East Hole may be significantly more costly than disposal at the New London Site (See Section IV of this volume).

59.6 Comment:

Given the polluted nature of the spoils, the Army and Navy recognized, quite properly in my judgement, that if the sediments were to be disposed of in ocean waters, they should be dumped in an area where they would

59.6 Comment continued:

not be dispersed over a wide area, but, to the extent feasible, would be contained where they were dumped. This was a primary conclusion of the Revised Draft Environmental Impact Statement, and on this basis a proven containment site off of Rhode Island was selected as the recommended location. However, in July 1973, the Rhode Island site was suddenly dropped -- and in its stead, the New London Dumping Ground was chosen, purportedly on the grounds that it, too, was a containment site. In my opinion, however, based on my familiarity with the site, and my studies of sediment transport, this clearly is not the case.

59.6 Response:

See Response 12.1

60.0 **LAW OFFICES OF BUTZEL AND KASS**

60.1 Comment:

The 6th Quarterly Report... includes the results of turbidity studies which indicate that scouring of spoil is occuring at the New London Dumping Ground. Specifically,... the comments on page 12 of the Quarterly Report, and on page 3 of the Appendix C, both of which show a downstream increase of turbidity as currents move across the spoil. This is clear evidence that spoils are being picked up and carried with the currents.

60.1 Response:

See Response 59.2

61.0 STATE OF CONNECTICUT, DEPARTMENT OF ENVIRONMENTAL PROTECTION, WATER COMPLIANCE UNIT.

61.1 Comment:

2.04 Commercial fishermen have expressed concern for shortdumping and the dumping of timbers, piles, or other pier-side rubble in open waters. Rubble, if not contained at a clearly identifiable dump point, may snag and damage fishing gear. These issues should be addressed in the revised supplement.

61.1 Response:

Pierside and/or construction debris will be disposed of by the contractor in compliance with state and local regulations. These materials will not be disposed of in the marine environment. Dumping by the dredging contractor is confined to dredge spoils and is effectively controlled by United States Army Corps of Engineers Inspectors. Accurate disposal is maintained by the use of a buoy marking the exact disposal site.

61.2 Comment:

Paragraph 2.09 should be revised to note which State and Federal agencies are represented on the Interagency Scientific Advisory Subcommittee on Ocean Dredging and Spoiling (ISASODS).

61.2 Response:

ISASODS members are listed in section 6 of the Summary to the SEIS.

61.3 Comment:

3.57 The general description of the New London site reflects the historical one-mile square site, not the enlarged site, as designated in the monitoring criteria made part of the Navy's original permit to dredge and dump. The Supplement's discussion of the New London dumping ground here, and in following sections, should be revised to reflect conditions prevailing within the 3.14 square mile dump site designated by criterion "j" of the Monitoring Criteria.

61.3 Response:

Thus far, all Navy disposal has been limited to the southwest corner of the historical one-mile square area (as described in paragraph 3.57 of the SEIS). The expanded definition of criterion "j" limits the extent of measureable influence from disposal to a circle of 1-mile radius from the disposal point. This circle has an area of 3.14 square miles , but has in no fashion been taken by the Navy as license to dispose of materials other than at the buoy.

61.4 <u>Comment</u>:

3.58 If, as the section states, bottom sediments found presently at the New London dump site consist primarily of spoil from Phase I disposal, what happened to the approximately 6 million cubic yards of material reportedly dumped at the site over the past twenty years?

61.4 <u>Response</u>:

The material discussed in paragraph 3.58 is the spoil actually disposed of during Phase I. Exhibit J of the FEIS contains information on the sediments at the New London Disposal Site prior to the initiation of the Phase I disposal effort. At that time, the site itself contained materials with a silt and clay content of up to 60%, while a nearby control station had a silt and clay content of only 30%. It would seem from these data that the sediments at the New London Site, prior to the initiation of disposal, were considerably finer than surrounding sediments. This is, some evidence of the past spoiling of the site.

In addition, point dumping was not practiced during earlier disposal operations, consequently, the spoil could be distributed randomly throughout the disposal site and would not form one large pile. There does appear to be an older mound of spoil to the northeast of the present spoil mound that can be seen in Figure 4 of Appendix K, however, disposal records, presented in Section IV of this volume, do not indicate any single project to which this pile might be attributed.

61.5 <u>Comment</u>:

3.59 - 3.60 Inspection of figures 3 and 5 of Appendix K show a broad flat mound existing at the dump site in February 1975. This does not appear to support the stated conclusion that the cohesive nature of the dredging of sediment prevents major erosion and transport (3.60). Indeed, it suggests that major erosion and transport may be occurring during the winter months.

61.5 <u>Response</u>:

The bathymetry results presented in Section IV show that no significant movement of the spoil has been observable.

Initial spoil compaction and slumping of the spoil mound is a recognized physical phenomena associated with dredge spoil piles. Bokuniewicz, et al., (ref. 283) have reported such settlement at the New Haven Dump Site, where both deflection of the original bottom and consolidation of the dredged material were found. Morton <u>et al.</u> (ref. 140) have documented the bathymetry of the spoil pile <u>based</u> on several surveys, the latest of which is that of August, 1976. A flattening of the upper surface has taken place. When the spoil was orginally deposited surface irregularities caused by individual dumps may have resulted in localized heightened turbulence. As these lumps were broken down, a more uniform surface elevation could be expected, and has been shown by later bathymetry.

61.5 Response continued:

A smoother surface such as this is much less subject to erosion than was the original spoil topography.

61.6 Comment:

3.61 The nature and limitation of the flume study to determine the critical erosion velocity of the Thames River sediments should be discussed in more detail. There is no discussion of how representative the sediment samples tested in the study were to the sediments to be dredged during Phase II.

61.6 Response:

The major problem relative to comparing flume tank measurements of critical friction velocity with in-situ conditions is in recreating the sediment surface. The sediments studied must of necessity be disturbed in their transport from the site to the laboratory tank which tends to make them more easily eroded, but conversely, they must be packed or spread into a box which tends to make the surface smoother and less susceptible to erosion. If the friction velocity observed in the tank were within 10 or 20 percent of the in-situ velocity then the result might be questionable due to the above mentioned errors. However, when the measured critical friction velocity is more than double the observed value at the disposal site (which is the case here) a statement of stability of the dredged material can be made with confidence.

Sediment samples (4) for the flume studies were collected from representative locations along a transect of the Thames River channel from the U.S. Naval Submarine Base down to the Gold Star Memorial Bridge (ref. 144). These sediments are to be dredged during Phase II.

61.7 Comment:

3.62 Average current or friction velocity data, in our opinion, have little applied utility. If the friction velocity field observed at the dump site was distributed such that the standard deviation equaled the mean, then 5% of the time the friction velocity would exceed the calculated 0.13 FPS threshold limit for spoil erosion. The conclusion presented in 3.62, that friction velocities encountered are substantially less than those required to erode the spoil material, is questionable and inconsistent with 3.63, which states that there may be some winnowing of fine material.

61.7 Response:

Based on information provided by G.S. Cook (NUSC) the standard deviation of the friction velocity field equaled approximately 10% of the mean. Further analysis of the BLT data presented in Morton et al. (Appendix N) indicated that a mean friction velocity of 0.04 fps was recorded for the period of observation. The maximum reported friction velocity at the East Hole Site was 0.08 fps and at the New London Site, 0.07 fps.

61.7 Response continued:

Thus the postulated erosional friction velocities have not been observed, nor are they likely at any reasonable probability level (See also Response 53.5 for a full discussion of the observations of winnowing).

61.8 Comment:

3.64 In paragraph 6.199 it is reported that wave-induced bottom currents may have a significant role in resuspension and transport of bottom sediments at the Browns Ledge site (depth 60 - 70 feet), and in 6.214 wave-induced currents were implicated as the motive agent in sediment erosion and transport at the Rhode Island site (depth about 100 feet), yet in 6.363 wave-induced erosion and transport was evidently not utilized in evaluating the retention ability of the various sites.

While consideration of "theoretical waves" is of critical importance and utility in decision making, the application of wave induced bottom currents to theoretical capacity rather than retention ability tended to exclude water depth and wave action as a significant factor in containment. Wave-induced resuspension and transport of dumped sediments should be factored into the evaluation of the retention ability or containment properties of the sites evaluated.

61.8 Response:

Wave influence in terms of fetch and exposure, was used in evaluating the retention abilities of all sites considered in Section 6, Volume I of the SEIS. A complete discussion of wave-induced bottom velocities as it might influence containment at New London and East Hole is given in Section IV of this volume.

61.9 Comment:

5.05 Table 3-6 (p. 45) indicates DDT concentrations in the 0.1 ppm range, not ppb range as indicated in 5.05. Tables 3.14 and 3.15 (p. 60) and the appendix should also be corrected: 1 ppm equals 10^3 ppb. Text discussion may require revision to reflect increased concentrations of DDT.

61.9 Response:

The values in Table 3-6 are correct and were the basis for the text discussion. The typographical errors in paragraph 5.05 and in Tables 3-14, 3-16 and Glossary have been corrected.

61.10 <u>Comment</u>:

5.48 While it is agreed that popular concern over the release of "toxic" materials into solution is mostly unfounded, the section fails to discuss, in any detail, the problem of biological mobilization of spoil constituents or toxicants from sediments by deposit or detrital feeding organisms.

61.10 <u>Response</u>:

See Section III of this volume.

61.11 <u>Comment</u>:

5.50 The broad flat mound observed in February (Appendix K) is difficult to understand by settlement and spreading alone. Were sediment core samples of the spoil mound and dredge site (or barges) taken to test the settlement spread hypothesis and to evaluate the role of erosion and transport?

61.11 <u>Response</u>:

On August 19, 1976 cores were taken of the spoil pile and tested to determine the extent of consolidation of the spoil material. The results of these tests indicate that maximum consolidation of the spoil pile can be expected within 5 months following disposal and that consolidation of the pile was may be as much as 1/6 of the original depth. Recent bathymetry surveys have also indicated that the size and shape of the pile has remained intact following a recent hurricane (See Section IV).

In addition, the phenomenon of spreading and settling has been observed at the New Haven Site where cores were obtained (ref. 283).

61.12 <u>Comment</u>:

5.51 Dispersed spoils, as opposed to contained spoils, could enhance mobility of associated pollutants such as PCB's. A larger spoil surface area is created by dispersal and greater exposure to toxicants results.

61.12 <u>Response</u>:

As stated in the abstract to the 4th Quarterly Monitoring Report, "No projects have demonstrated the dredging-dumping operation to have more than localized impacts." Monitoring studies have indicated that the spoils are being contained within established perimeters of the New London Dumping Ground as required by the permit criteria set forth in United States Army Corps of Engineers Permit #CT-Lond-74-63. Confinement of spoils to the disposal site will serve to limit the mobility of associated pollutants such as PCB's. A larger spoil surface

61.12 Response continued:

area as created by disposal at yet another site (East Hole) will provide much greater exposure of toxicants to the surrounding environment, thereby increasing the impacts on the total fisheries resource.

61.13 Comment:

5.52 In our opinion, the stability of the existing New London spoil pile is questionable. No long-term observations were made which support the contention that the New London spoil mound is temporarily stable.

61.13 Response:

In the year since dumping ceased, the spoil pile has remained at the disposal site. This alone confirms temporary stability. The long-term stability of the spoil pile cannot be definitively proven or disproven until a sufficient amount of time has passed (see Section IV).

61.14 Comment:

5.53 through 5.55. The discussion of the implications of placing berthing area and pier-side spoil, Navy and non Navy, on top of cleaner channel spoil, need to be expanded to include concerns for toxicant uptake directly from sediments as noted in the 5.48 comment above. Revised discussion should include an evaluation of the relative dispersability or spreading of Phase I sediments.

61.14 Response:

See Section III of this volume for a discussion of mobilization of toxics by benthic organisms. See also Section IV as to Phase I sediments. See Response 28.15 for a discussion of the potential for capping pierside sediments.

61.15 Comment:

5.54 In our opinion, the applied utility of caged organism experiment is questionable. If heavy metal release to the water column is a relatively short term event, heavy metals accumulated by caged shell fish at or near the dump site would reflect the quality of waters passing by the cage, rather than metals released during disposal operations. As noted in 5.55, tidal action should disperse and dilute metals additions attributable to dumping. Since the vast bulk of the metals as well as other potential toxicants will remain attached to sediment particles during and after dumping, it may be more meaningful to focus monitoring energy on metal uptake from sediments rather than from the waters.

61.15 Response:

Assuming that metals are released from the sediments into the water column, properly located and conducted caged-organism experiments should reflect the influences of these releases. The influences of contaminants remaining in the sediments could be best monitored using shellfish. Even in this case, however, caged-organism experiments would be preferable, since predation or burial of free-living organisms would impair the reliability of results. The use of caged-organism experiments, either in the water column or on the sediments, is a common and statistically reliable procedure in environmental monitoring.

61.16 Comment:

5.56 Table 3-6 (p. 45) indicates PCB levels as high as 11 ppm. These sediments will be dumped last and could be subjected to widespread dispersal at the junctures of Fishers and Long Island Sounds. Biological mobilization of the PCB load could result in far-reaching environmental impacts.

61.16 Response:

See Responses 28.15, 53.4 and Section III of this volume.

61.17 Comment:

5.66 Paragraphs 5.66, 6.68 and 6.132 imply that the use of existing disposal sites is generally desirable and is EPA policy. However, 230.5a (40 CFR 230) states the general considerations and objectives of regulations governing disposal sites: "consideration shall be given to.......availability of alternative sites.....that are less damaging to the environment.........." The Department has reviewed the data and arguments presented in the supplement and has concluded, that of the sites considered, disposal at a point within the East Hole area would be least damaging to the environment (see general comments, presented at the joint hearing on June 10th).

The argument offered by the supplement in 5.66, 6.68 and 6.132 appears to have been taken out of context. Section 230.5(b) (f) (40 CFR 230) Benthic Life states:

> Disposal sites should be areas were benthic life which might be damaged by the discharge is minimal recognizing that enhancement may also occur. Use of existing sites is generally desirable.

Volumes 1 and 3 of the Supplement indicate benthic life is more diverse and better developed at the New London site than at East Hole.

61.17 Response:

Further support for the use of existing disposal sites is found in the Army Corps of Engineers regulations for ocean disposal (33 CFR 209.120.g.17.iii) where it is stated that:

> "Sites previously designated for use as disposal sites for discharge or dumping of dredged material will be specified to the maximum practicable extent in permits for the discharge or dumping of dredged materials in navigable waters or ocean waters unless restricted by the Administrator, EPA, in accordance with Section 404(c) of the Federal Water Pollution Control Act or Section 102(c) of the Marine Protection Research and Sanctuaries Act of 1972."

Such a restriction is not in effect at the New London Site.

Finally, further details on benthic life at East Hole and New London are given in Section IV of this volume and show that East Hole has more valuable and more sensitive biological resources than those at the New London Site.

61.18 Comment:

5.61 and 5.73. While dredging "polluted sediments" from the Thames River may have beneficial effects on river fisheries, dumping these materials would not necessarily be beneficial or enhancing to fisheries resources at the dump site. As noted in 5.62, accumulation of spoil constituents potentially could render the fisheries resource from the dump site undesirable for human consumption.

61.18 Response:

It is recognized that the New London Dumping Ground is being used as a disposal site for contaminated dredge materials. The development of a sufficient data base to determine the consequences of the long-term impacts these contaminents may have on the food chain has been limited by the current State-of-the-Art. Until these questions can be satisfactorily resolved as concerns the health of man, it is good policy to recommend that the fishing of a possibly contaminated area be discouraged for the short-term, even in the absence of actual evidence of contamination of fish. There is no indication of such contamination at New London and lobster harvest is occurring at the site.

61.19 Comment:

5.65 While the historical Cornfield shoals dumping ground is clearly a "dispersal site" it should be noted that a new disposal point 3SW of the historical mile square dump has recently been designated by the Corps of Engineers. This new area exhibits characteristics of containment. However, this does not affect the remainder of the discussion in the Supplement as far as the historical Cornfield Site is concerned.

61.19 Response:

The comment is noted. Paragraph 5.65 of the SEIS has been amended to indicate that the site is the historic Cornfield Shoals Site. The remainder of the discussion deals exclusively with the historical site.

61.20 Comment:

5.73 and 5.75 These paragraphs seem to contradict one another.

61.20 Response:

While paragraph 5.73 addresses the effects of the proposed Navy dredging and disposal, paragraph 5.75 must be read in conjunction with the preceeding paragraph 5.74, which discusses on-going clean-up of point sources in the Thames River.

61.21 Comment:

6.82 Although Dehlinger et. al. (refs. 64, 65), indicate Long Island Sound sediments are sinks for metals, they further indicate that it is western Long Island Sound and especially the central basin muds which are the main sinks. Generally, eastern Long Island Sound is not a sink for heavy metals nor for fine grain sediments.

61.21 Response:

The comment is noted. However, see MACFC Special Report No. 42, which contains sediment data for all of Long Island Sound. This indicates that areas of eastern LIS are populated by fine grain sediments.

61.22 Comment:

6.287 Our evaluation of data presented in the supplement indicate that East Hole is a containment site. This is in contrast to the conclusion in 6.287 that East Hole is marginal for spoil containment. The supplement's conclusion evidently was based on average sediment data while the central band (6.284) sediments, which contain 75% or greater silt-clay, should have been the focal point for comparative purposes.

Further, we fail to see how the current studies by Morton et al. (ref. 140) can not be used to predict the behavior of dredged spoil dumped at East Hole. If the research data provided by Morton et. al. and the Corps of Engineers are insufficient to predict the behavior of material dumped at East Hole, the utility of similar measurements made at New London would likewise be insufficient to predict behavior of spoil at that site. We believe the data are good and do have predictive utility.

61.22 Response:

See Section IV of this volume.

61.23 Comment:

6.359 Figures 6-21 and 6-22 indicate the Niantic site is a containment site while the text (6.319 and earlier discussions) clearly states it has dispersal characteristics. Also, 5.65 states that the Rhode Island site is a containment site while Figure 6-21 states it is a dispersal site. How does this affect conclusions and analyses summarized in Figure 6-22 and Table 6-11?

61.23 Response:

These inconsistencies, which resulted from a typographical error in paragraph 5.65, have been corrected. The correct designation for Cornfield Shoals is a dispersal site and for the Rhode Island Sound Site is as a marginal containment site.

61.24 Comment:

6.379 Diversity values from the monitoring reports for the greater New London dumping ground area should be contrasted with other sites being evaluated and not just diversity values from the repopulating spoil mound.

61.24 Response:

The relative diversities in and around the New London site are discussed in Section IV of this volume and were used in the original biological discussions in the SEIS.

61.25 Comment:

6.380 Fish species diversity was lumped with benthic diversity to contrast the East Hole and New London sites. Was this also done for New London and the other sites where good data are available? A clear statement of the relative fish and benthic diversities from the two areas in question is needed to evaluate the validity of the conclusion drawn. The biology statement under New London in Figure 6-21 does not accurately reflect benthic diversity of the area. The first quarterly monitoring report indicates over 150 invertebrate species found in the spoiling area while Figure 6-21 in the Supplement lists only about seven.

61.25 Response:

In all cases, the Biological ranking was based on a combination of resident populations of both benthic organisms and fish. Corroborative information on fish populations at East Hole is discussed in Section IV. These data are applied to a detailed reconsideration of ranking. This reconsideration includes comparisons of benthic diversities for the East Hole and New London Sites, and a separation of fisheries and benthic resources.

The species list on Figure 6-21 refers to those organisms inhabiting the spoil pile, not to the broader suite found in nearby areas unimpacted by dredge material.

61.26 Comment:

11.05 Water Quality considerations - (Page 323)........ Delineation of the mixing zone is not demonstrably consistent with procedures outlined in 230.5(e), 40 CFR 230. Is the proposed mixing zone enclosed by the perimeter of the one mile square historical dump site or by the perimeter of the 3.14 square mile circular area designated in criterion J of the Criteria made part of the Navy's original permit?

61.26 Response:

The criteria as set forth in the *U.S. Army Corps of Engineers* permit Ct-LOND-74-63, indicate that no measurable effects of disposal should be observed at a distance 1.0 miles away from the dump site, covering an area 3.14 square miles. This is considered to be the smallest practical mixing zone necessary to achieve compliance. See also Response 61.3.

61.27 Comment:

Page 330, Paragraph 3. --- It is the Department of Environmental Protection's opinion that the draft supplement does not meet 230.5 (40 CFR 230) requirements with respect to discussion and conclusions drawn from otherwise good data from the New London and East Hole sites.

61.27 Response:

The relative merits of East Hole and New London are the subject of Section IV of this volume.

61.28 Comment:

11.06 In light of the Supplement's conclusion that East Hole was a less environmentally desirable location for a dump site than the New London site, the rationale for requesting the EPA Regional Administrator to designate the "less desirable site", East Hole as an alternative site for disposal in the event the criteria are violated at New London, is difficult to follow.

61.28 Response:

East Hole was one of the highly ranked sites overall (3rd) and seems a reasonable "second best", based on the fact that monitoring has been carried out and a data base begun (See also Section IV of this volume).

62.0 U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION I

62.1 Comment:

From the standpoint of our jurisdiction and expertise, we believe that this document, supplemented by the Final Report of the Navy's biological study of the East Hole Site, provides an adequate assessment of the project's potential impacts on the environment.

62.1 Response:

See Response 13.3. The data from the Final Report have been used in the responses to many of the comments received on the SEIS.

62.2 Comment:

According to EPA guidelines on the discharge of dredged materials, the use of existing disposal sites is generally desirable. [See Federal Register, September 5, 1975, Section 230.5 (b)(7)]. In addition, under Section 404 (c) of the Federal Water Pollution Control Act, the EPA Administrator may deny use of a dump site if such use will have an unacceptable adverse effect on municipal water supplies, shellfish beds, fishing areas, wildlife or recreational areas. However, we note that the State of Connecticut, in a statement by Melvin J. Schneidermeyer on June 10, 1976, has stated that the risks associated with continued use of the present site are unacceptable and recommends the use of the East Hole site. Based on the information provided in the Draft Supplement on bottom current velocities, physical sediment characteristics, and fish and shellfish harvest, the East Hole site and the New London site do not appear to be significantlly dissimilar. We would not, therefore, object to the use of either site.

62.2 Response:

The comment is noted.

63.0 CONNECTICUT STATE HISTORIC PRESERVATION OFFICER

63.1 Comment:

The State Historic Preservation Officer has reviewed the proposal of the U.S. Navy to dredge material from the channel of the Thames River.

In the opinion of the State Historic Preservation Officer, such dredging will not have an adverse effect on historic or archaeological resources in the State of Connecticut.

63.1 Response:

The comment is noted.

64.0 ADVISORY COUNCIL ON HISTORIC PRESERVATION

64.1 Comment:

Thank you for your request of April 22, 1976, for comments on the supplement to the final environmental statement for "Dredge River Channel", Naval Submarine Base, New London, Connecticut.

Pursuant to our responsibilities under Section 102 (2)(C) of the National Environmental Policy Act of 1969 and the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800), we have determined that:

Your supplement environmental statement does not contain sufficient information concerning historic and cultural resources for review purposes. Please furnish data indicating:

a. Compliance with Section 106 of the National Historic Preservation Act of 1966 (89 Stat. 915)
The supplement must demonstrate that either of the following conditions exists:

1. A property listed in the National Register of Historic Places is not located within the area of environmental impact, and the undertaking will not affect any such property. In making this determination, the Council requires evidence that you have consulted the annual edition of the National Register (Federal Register, February 10, 1976, and its monthly supplements.)

2. A property listed in the National Register is located within the area of environmental impact, and the undertaking will or will not affect any such property. In cases where there will be an effect, the final environmental impact statement should contain evidence of compliance with Section 106 of the National Historic Preservation Act through the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800).

b. Compliance with Executive Order 11593 of May 13, 1971 (16 U.S.C. 470).
The supplement must demonstrate that either of the following conditions exists:

1. A property eligible for inclusion in the National Register of Historic Places is not located within the area of environmental impact, and the undertaking will not affect any such property.

64.1 Comment continued:

In making this determination, the Council requires evidence of consultation with the appropriate State Historic Preservation Officer and evidence of an effort to endure the identification of such properties. The Council recommends that comments of the State Historic Preservation Officer be included in the final environmental statement.

2. A property eligible for inclusion in the National Register is located within the area of environmental impact, and the undertaking will or will not affect any such property. In cases where there will be an effect, the final environmental statement should contain evidence of compliance with the Executive Order through the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800).

c. To ensure a comprehensive review of cultural and historical resources, the Advisory Council recommends that the supplement contain evidence of contact with the appropriate State Historic Preservation Officer. A copy of his comments concerning the effects of the undertaking upon these resources should be included in the environmental statement. The State Historic Preservation Officer for Connecticut is John W. Shannahan, Director, Connecticut Historical Commission, 59 South Prospect Street, Hartford, Connecticut 06106.

64.1 Response:

The comments are noted.

[Note to reviewers: The additional information requested was forwarded by letter on July 14, 1976. The acknowledgement of compliance was received and presented as Response 69.0.]

65.0 U.S. DEPARTMENT OF THE INTERIOR - FISH AND WILDLIFE SERVICE

65.1 Comment:

Data appears to indicate that the New London Dumping Ground exhibits characteristics of a dispersal, rather than a containment, disposal site. We note that the second quarterly monitoring report identified spoil material one-quarter mile northwest of the dumping buoy. By October 1975, several months after disposal ceased, spoils extended more than one-half mile to the east, and between one-quarter and one-half mile in other directions (Fifth Quarterly Monitoring Report).

65.1 Response:

The data collected to date do not indicate a dispersal designation for New London. The comparison between spoil pile size and location, which is the basis for this comment, must be made in light of the conditions obtained during the two surveys. It is to be expected that the dimensions of the pile reported in the 2nd Quarterly Monitoring Report would be less than the dimensions reported in the 5th Quarterly Monitoring Report. In January of 1975, when the data for the 2nd Quarterly Monitoring Report were gathered, disposal had been taking place at the original disposal buoy and only 40% of the total material had been disposed of. At this time, spoils were reported 1/4 mile WNW of the original disposal point and 1/4 mile ESE of the original disposal point.

When disposal was resumed in late January, the disposal point was moved to the southeast to prevent excessive spoil pile buildup at the original disposal point. The remaining 60% of the material was disposed of between January and June of 1975. The southeast movement of the disposal point gave the spoil pile an elliptical shape, trending NW-SE. Following the end of disposal, bathymetric surveys of the spoil pile have been run periodically. The surveys, reproduced in Section IV, show no substantial change in the location or shape of the spoil pile over the last year. In fact, the same page of the 5th Quarterly Monitoring Report which describes the spoil pile dimensions (page 25) also notes that, "No disruption of the spoil pile or its infauna by (a recent) storm was apparent".

65.2 Comment:

That dispersal appears to be taking place is further suggested by bottom current and spoil pile scour measurements. Maximum observed bottom current velocities, averaged over a 15-minute period, during 1975, have included values of 2.01, 1.86, 1.95, 1.84, and 1.80 feet per second, more than enough to erode Thames River spoil material.

65.2 Response:

As noted in the Response 53.5, the tidal current velocities referred to were measured 1 - 1 1/2 meters from the bottom. The erosion velocity was measured at 6 inches from the bottom and corresponds to a velocity of 2.33 feet per second one meter off the bottom. Thus, no erosive velocities have been measured.

65.3 Comment:

Spoil pile scour experiments, as reported in the sixth quarterly report, indicated that some erosion of the spoil mound was occurring. In comparison, we understand that spoil piles remain clearly recognizeable at the New Haven Dump Site, contrary to experience at the New London Dump Site.

65.3 Response:

The spoil pile scour experiments referred to were characterized in the 6th Quarterly Monitoring Report as inconclusive, "so that direct reduction due to scouring is difficult to determine". (See also Response 59.2)

65.4 Comment:

Regarding the alternate dump site at the East Hole in Block Island Sound, preliminary data regarding currents, sediments, benthic organisms and finfish are available. Information concerning currents and sediments is apparently not conclusive in resolving the containment or depositional character of the East Hole site as a whole. Some areas within the designated disposal site, however, may be more conducive to containment, based on sediment characteristics, than others. Further investigation is necessary in this area.

65.4 Response:

This is one of the reasons that New London, where actual spoil monitoring studies have been conducted, was viewed as a more favorable site. More detailed discussions of currents and sediments at East Hole are to be found in Section IV of this volume.

65.5 Comment:

There can be no question that the site (East Hole) supports benthic invertebrates important as food for finfish, several of which are of considerable commercial importance. Actual fishermen use of the site has not been documented, but preliminary inquiries have determined that more use is made of areas to the east and south of the site.

65.5 Response:

The SEIS indicates that a limited amount of finfish trawling takes place at and around the East Hole site. This comment was predicated on reports from Stonington fishermen and other boat captains who in effect indicated that; "yes, we fish the area" but were reluctant to disclose the extent and yield of their favored areas. See Section IV of this volume for our evaluation of that fishery.

65.6 Comment:

Regarding anticipated volumes of spoil, we note that within the next ten years somewhat over five million cubic yards of material is anticipated to be dredged from the Thames River. By any measure, this is a large volume of spoil. Most of this material is fine grained and some, such as from berthing and dockside areas, contaminated with heavy metals, PCB's, and oils and grease. My concern is that this spoil material will be transported out of the dump site with no remedial action being possible.

65.6 Response:

The Navy spoil over the next decade amounts to 2.8 million cubic yards. The character of these spoils has been extensively documented in the SEIS and will not be duplicated here. The Navy currently has no reason to suspect large scale transport of materials from the New London site (see Response 13.2).

65.7 Comment:

What is not definitely known or agreed to are the subtle, chronic effects of spoiling at a particular site over a period of time. This is best illustrated by the general agreement among scientists that disposed sites exhibiting containment characteristics are preferable to those being dispersed in nature, so that should there be adverse effects, they would be confined to as small an area as possible. With the recent awareness that contaminated sediments may form the base for pollutant transfer up the long chain, the containment of these types of sediments becomes more important.

65.7 Response:

The point that is germane to this situation is "Where will the spoil and potential effects produce least impact?" These effects are discussed at length in Section III. See also Section IV ("Distance/Dilution").

65.8 Comment:

Thus, it is believed that spoil disposal sites should not only be containment in nature but be located as far as practicable from fish and wildlife habitats of importance, especially to man.

65.8 Response:

This concern is addressed Section IV of this volume.

65.9 Comment:

In summary, it is the opinion of the Service that although large in volume, spoil disposal at the New London Dump Site has not caused any significant adverse impacts outside of the disposal area, to date. Disposal of the U.S. Navy's Phase II dredged material, and subsequent spoil from other projects over the next ten years does appear to be a legitimate cause for concern. Furthermore, being located in a near shore, estuarine environment, spreading of spoil material from the New London Site has a potential for causing harm to adjacent fish and wildlife resources and their habitats.

65.9 Response:

This concern is addressed in Section IV of this volume.

65.10 Comment:

On the basis of overall effects on fish and wildlife resources and their habitats, it is the opinion and recommendation of the U.S. Fish and Wildlife Service that disposal operations at the New London Dumping Ground be phased out and that steps be initiated to designate and utilize the East Hole as a disposal site.

65.10 Response:

The comment is noted. Based upon known data and objective analysis, continued use of the New London Site is preferred over the use of East Hole for the disposal of Navy Phase II sediments.

66.0 DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE - REGION I

66.1 Comment:

The New London Dumping Grounds is located in an area which has shellfish resources but, according to the report, its not heavily harvested. Nevertheless, the area is classified by the Connecticut Health Department as being approved for the direct marketing of shellfish. With the commencement of dumping, this area will no longer meet the health requirements of the FDA and should be closed to any harvesting.

While HEW's Food and Drug Administration is generally opposed to any ocean dumping of contaminated dredge spoils, in this case there does not appear to be any alternative land site we could recommend as an alternative. It is gratifying that considerable effort was apparently made to assess alternative disposal sites.

66.1 Response:

The comments are noted.

312

67.0 UNITED STATES DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

67.1 Comment:

The Bureau of Sport Fisheries and Wildlife, therefore, recommends that the proposed permit be amended to include the following conditions:

1. Specific criteria used in evaluating whether the authorized dredging and disposal is being performed in an acceptable manner will be developed by the Scientific Advisory Sub-Committee of the Inter-Agency Coordinating Committee on Dredging and Disposal.

2. A determination as to whether the project is being performed in an acceptable manner, and any course of action deemed necessary if such is not the case, shall be made by the parent Coordinating Committee, after review of all pertinent information developed by the monitoring and environmental effects study, and upon consideration of any recommendation of the Scientific Advisory Sub-Committee.

67.1 Response:

These recommendations, made in April of 1974, lead to the inclusion of monitoring criteria in the original Navy permit for Phase I. The conditions of this Fish and Wildlife Coordination Act Report would also govern Phase II efforts.

68.0 U.S. DEPARTMENT OF COMMERCE

68.1 Comment:

Page 12, paras. 2.02 - 2.08

As the Base Master Plan Final EIS has not been developed, the assessment found in Appendix A fails to assess the Submarine Base's total impact on biological resources or to provide exact designs of all proposed activities at the site. Therefore, it would appear that this discussion is premature.

68.1 Response:

See Response 45.1.

68.2 Comment:

Page 29, para. 3.17

Reviewing the sediment analyses which were presented in Appendix C of the Navy's FEIS and the data presented here, there appears to be a noticeable increase in the percent of fines, organics and water in the sediments as one moves up river. This should be discussed in the final statement.

68.2 Response:

The data presented in Appendix C of the FEIS are based on a special settling test conducted in sea water to determine the flocculated behavior of Thames River sediments. Sediment size results for the Phase 2 material are presented in paragraph 3.18 of this SEIS. Generally, there is a slight decrease in size as one moves upstream, but silt is the dominant grain size in the bulk of the samples. As discussed in the FEIS, there is an increase in some parameters in an upstream direction. Further information on chemical aspects of this phenomenon is found in Response 25.8.

68.3 Comment:

Page 42, para. 3.27

Comparing ocean disposal of processed sewage sludge with inshore disposal of non-processed dredge spoil has limited value as the receiving areas are uniquely different.

68.3 Response:

The comparison referred to, is between Thames River sediments and sewage sludge which is regularly disposed of in the New York Bight. This was included to point out to the reader that the materials being disposed of in the Navy effort are not of the same character quality or magnitude as sewage sludge. No attempt was made to compare the effects of these two unrelated materials on any receiving area.

68.4 Comment:

Page 43, para. 3.30

If attempts are being made to rectify the underground seepage of petroleum products at the base, they should be identified.

68.4 Response:

See Response 22.2

68.5 Comment:

Page 47, para., 3.36

Recent studies by Chen et al., conclude that "most of the chlorinated hydrocarbons are found to be associated with fine particle and macromolecular organic compounds". It is our understanding that the EPA may set a limit of 0.001 micrograms of PCBs per liter in water. Should that criteria be used, all samples would exceed the maximum allowable level.

68.5 Response:

The discussion in paragraph 3.36 of the SEIS concerns concentrations of chlorinated hydrocarbon compounds in dredge spoil sediment as determined by bulk chemical analyses. These concentrations are presented in Table 3-6 of the SEIS and are normally reported as the percent dry weight of sediment or milligrams per kilogram. The Chen et al., study (ref. 43) referenced above does not apply to bulk sediment analyses but rather, addresses chemical mobility between sediment and water phases as occurs during hydraulic dredging procedures and/or elutriate analyses. Likewise, the reference to a proposed EPA standard of 0.001 ppb for PCBs in water does not apply to sediment chemistry as determined by bulk chemical analyses. Detection of chorinated hydrocarbons and PCBs in sediment samples require different analytical procedures than do water samples. The techniques employed for the detection of these compounds in water are orders of magnitude more sensitive and are

68.5 Response continued:

necessarily reported as micrograms per liter rather than milligrams per kilogram. Therefore, sediment analyses should not be compared to elutriate analyses or water phase standards. Present waste disposal restrictions issued by EPA are designed to maintain PCB levels below 0.01 micrograms per liter in rivers and streams (ref. 289).

68.6 Comment:

Page 53, para. 3.46

The nature and extent of the biological sampling should be presented.

68.6 Response:

The nature and extent of biological sampling and analyses are presented in Figures 3-1, 3-2, Tables 3-10, 3-11, 3-13, and Appendix H.

68.7 Comment:

Page 59, para. 3.52

EPA has modified its elutriate testing criteria and no longer requires 1.5 times the background concentration for a determination of polluted materials.

We readily agree that there are serious deficiencies in some data resulting from bulk chemical and elutriate analysis. However, modifications to the elutriate test, now under review by the EPA and Corps of Engineers, may provide more realistic information regarding resuspension and release of heavy metals and toxic chemicals resulting from open-water disposal operations.

Regardless of which assessment technique is used, it appears that spoil generated by Phase 2, with inclusion of the berthing area, is signifiantly more polluted than Phase 1 material.

68.7 Response:

Proposed EPA revisions to their Ocean Dumping Regulations and Criteria (40 CFR 220 to 229) were published in the Federal Register on June 28, 1976. These proposed regulations will be subjected to a lengthy public review process before being made final. At this time, the elutriate test is still in effect and must be considered (along with the 1.5 multiplier) until the new regulations go into effect. When these will become effective is not known.

68.7 Response continued:

In terms of the bulk quality of Phase 2 spoil, the bulk chemical analyses for all channel sediment samples were presented in the FEIS and are not duplicated here. The analytical results did show that upstream sediments were somewhat higher in concentration of constituents than the Phase I sediments. The comparison between berthing area sediments and channel sediments is covered in some detail in Paragraphs 3.22 to 3.36 of this SEIS, and do show that berthing area sediments (both Navy and non-Navy) contain more oil and metallic elements than channel sediments, but less volatile solids and nutrients. Response 25.8 contains further details of this comparison.

68.8 Comment:

Page 68-69, paras. 3.58 - 3.60

To our knowledge, the underwater television studies by Morton et al., (ref. 140) were performed no later than September 1975. As disposal activities terminated in July 1975, little movement would have been expected or looked for by the researchers.

The appearance of coarse material on the disposal site probably results from dredging near the entrance to the river. This theory is supported by sediment analyses performed in the area.

Bathymetric studies appear to have terminated shortly after completion of the spoiling. Within that time frame, the data show that water depths over the spoil increased. Morton et al. (ref. 140), concludes that this was due to compaction alone. We suggest that compaction was only part of the cause and that erosion of the fines was another, unreported, aspect. In our opinion, these two parameters jointly provide a more reasonable basis for the depth increases reported by Morton et al.

Collectively the above points indicate that spoil placed in the New London disposal site during Phase 1 is less polluted and has a generally larger grain size than that expected from Phase 2. The larger grain size would tend to make Phase 1 material less subject to the erosional forces found at the New London disposal site. Recent in-site sampling around the disposal site buoy support these hypothesizes. Much of the spoil area near the buoy is now paved with a sand/silt cover up to three inches in thickness. This "cap" is occasionally interspersed with cobble-sized stones and has the weathered tips of spoil clods protruding through it. The surficial fines mentioned by Morton et al., appear to have been winnowed in a south-southeasterly direction. These winnowed materials are clearly spoil material and are found at several locations. One-half mile from the disposal buoy they still appeared to be more than four inches thick. These most recent in-site observations conflict with several statements made in this section.

68.8 Response:

See Response 65.1 for a discussion of the spoil pile shape. Section IV of this volume includes the latest data on the New London Site, but this data does not include new television studies. Instead, bathymetric results from as recently as August of 1976 have been used. See Response 68.2 regarding the slight difference in sediment grain sizes between Phase I and Phase II materials.

68.9 Comment:

Page 99, para. 5.11

Regardless of how limited in scope the blasting might be, it should be identified as to location, type and volume of material to be removed.

68.9 Response:

Engineering test borings provide evidence that blasting will not be required. However, if during construction, underlying obstructions are located within the project area and cannot be removed by conventional means then blasting may be used as a last resort.

68.10 Comment:

Page 104, para. 5.19

If channel depths and the General Dynamics Corporation, Electric Boat Division require dredging only to - 36 (MLW), why are the Naval Pier areas being dredged to - 39 feet (MLW)?

68.10 Response:

General Dynamics is a builder of the SSN 688 submarines. They have applied for a permit to dredge to - 36 feet to allow the movement of the newly constructed ships. The Navy's requirement for -39 feet is based on fully laden ships and provides some extra clearance for added manueverability. Also note that paragraph 5.19 of the SEIS discusses the possibility of an Electric Boat requirement for -39 feet (MLW).

68.11 Comment:

Page 113, para. 5.36

None of the studies performed on the relatively clean Phase I spoils has surpassed two years in length. The quality of the Phase 1 material and its manner of removal to some extent have inadvertently protected adjacent areas from high levels of migrating polluted spoils. As pointed out this situation may not prevail under Phase 2 and other future activities. We believe it would be appropriate to discuss probable future impacts of spoiling.

68.11 Response:

Since the methods of removal, transport, and deposition of the Phase 2 spoils will be the same as those used during Phase 1, any "inadvertent" benefit may be maintained. The assessment in this Supplement is based on the measured characteristics of Phase 2 and other future spoils, not on the characteristics of Phase 1 spoils. The studies at the disposal site necessarily involved Phase 1 spoils, but all chemical and physical testing (including elutriate tests and erosion velocity tests) were done on Phase 2 sediments. Thus, the analysis does consider explicitly the spoils to be disposed of in the future and discusses the probable effects of this future disposal. See paragraphs 5.63-5.76 of the SEIS. The evaluation set forth in Volume I, Section 6 and Volume II, Section IV were based upon the chemical and physical characteristics of Phase II spoils.

68.12 Comment:

Page 114, para. 5.40

A fourth major concern is alteration of habitat and exclusion of organisms at some sampling stations induced by such alterations. This condition is occuring at the New London site and should be discussed in future presentations.

68.12 Response:

Alteration of habitat and selective exclusion of a number of species is an obvious impact of spoil disposal, whenever it takes place. The point must also be made, however, that portions of the local climax community are already on the spoil mound. Not only is recolonization progressing at an acceptable rate, but the benthic macroinvertebrate species diversity of the spoil pile is approximating that of the surrounding unspoiled areas. Phase II sediments may contribute to a slower recolonization wherever they are placed. However, it is anticipated that a a climax community will colonize the mound (See Section III of this volume).

68.13 Comment:

Page 116, Para. 5.46

Based on unpublished and preliminary research findings, it has been our understanding that petroleum products are the primary tainting agents at the Rhode Island Sound site, not heavy metals. If this understanding is correct, we suggest that possible tainting impacts associated with oil and grease in the materials to be disposed of under Phase 2 be discussed.

68.13 Response:

The preliminary and unpublished research findings alluded to by the National Marine Fisheries Service letter is a telephone conversation between a representative of Blount Seafoods, Warren, RI and the NMFS Milford, CT laboratory, after tainted meats had been found in ocean quahaugs harvested near the Rhode Island Sound dumpsite. In that conversation it was reported that a petroleum or oily flavor existed in the meats (Ludwig, pers. comm.). Dr. Gerald Pesch (E.P.A., Kingston, RI) reports that at the present time, there are no data to verify the source(s) of shellfish meat tainting. The EPA has also awarded a grant to Dr. James Quinn of the University of Rhode Island, to investigate total hydrocarbon concentrations in the ocean quahaug as they relate to the Rhode Island Sound disposal site and surrounding areas. Preliminary information from this study indicates that, with the exception of a small 2 km band around the dumpsite, there may be little correlation between total hydrocarbon concentrations in the sediment and concentrations in *Arctica islandica*. Additionally the hydrocarbon concentration gradients are stronger in sediment than the quahaug. There is also a time differential to be considered in regards to this report and the present research. The tainted shellfish were reported while disposal at the Rhode Island Sound site was being conducted (*circa* 1968-1970). The present research is being conducted some 5 years after the final dumping. Therefore direct shellfish tainting may be a shorter term rather than longer term impact. However the data to verify this occurrence are not yet available.

68.14 Comment:

Page 117, Para. 5.48

Several facts are not considered in drawing the conclusion that Thames River material could be used to "cap" the sediments of the Rhode Island Sound site. For example;

1. Phase 2 will involve somewhat finer grained material which will be more susceptible to migration.

68.14 Comment continued:

2. Phase 2 material is apparently more polluted than Phase 1 material.

3. At least in some instances, coarser material may sink through the (finer) material to be capped and, therefore, be ineffective for this purpose.

4. Data from the monitoring studies does not extend beyond September 1975. As final disposal efforts were concluded in July 1975 the data base is extremely narrow.

Chen et al expressed concern over resuspension of trace metals and chlorinated hydrocarbons associated with macromolecular organics and suspended particles. As this situation is likely to occur during the Phase 2 dredging, this topic should be discussed.

68.14 Response:

The sediments at New London are significantly less contaminated than those disposed of at the Rhode Island Sound Site. The statement that New London spoils might be used to "cap" Rhode Island Sound Site sediments was intended to be illustrative of that observation, rather than a recommendation for a course of action.

Navy monitoring efforts, reported in Paragraphs 5.02, 5.03 and 5.04, indicate that release of heavy metals has not occurred during Phase I dredging. In fact, mercury levels within the dredge plume were lower than in background water levels.

Additionally, the plume contained proportionally smaller amounts of fine (1 to 2 micron) particles than the background river water.

Monitoring data from the spoil pile are available from as recently as August of 1976. These results discussed in Response 13.2 show no detectable movement of the spoil pile.

Chlorinated hydrocarbons discussed in Section IV of this volume, are not expected to present cause for concern.

68.15 Comment:

Page 118, Para. 5.50

The authors of Appendix K conclude their introduction by noting that the degree of error in their calculations could be larger. The factors of limited exposure to erosive activity and the inherent accuracy restrictions of both detection systems should also be noted.

68.15 Comment continued:

Determining the amount of compaction which had occurred solely from depth and sonar records without obtaining any spoil water content data ignores inherent inaccuracies within the analyses. Notwithstanding those inaccuracies, and simply applying the 5 percent migration volume alluded to, we note that 75,000 cubic yards have moved offsite under Phase 1. The figure could increase to well over one quarter of a million cubic yards as a result of spoiling the volume proposed for offshore disposal by 1985.

68.15 Response:

See Responses 13.1, 61.11 and Section IV of this volume.

68.16 Comment:

Page 118, Para. 5.51

Burial and suffocation of organisms is significantly more important than the possibility of inducing a fertilizing effect, especially in the New York Bight where the Hudson River appears to carry a far larger load of organic materials than New York disposes of in its sludge dumping practices.

68.16 Response:

Burial and suffocation of organisms is discussed as a short-term negative effect of the disposal operation in Paragraphs 5.43, 5.44, and 5.58 of the SEIS. Also noted in Paragraph 5.58 is the evidence developed to date that recolonization is underway, indicating that this impact is, in fact, temporary.

The comparison to the New York Bight was made to show that, even where extremely organic spoils are involved, fertilization of nearby areas is not detectable. Thus, no such effects can be expected from the much less organic spoils being dealt with here. (See also Section III of this volume).

68.17 Comment:

Page 119, Para. 5.52

Gordon's discussion noted that the turbidity-induced "density current" carried material laterally at the bottom. This lateral migration should be addressed.

68.17 Response:

"Dispersion of Dredge Spoil Dumped in Near-Shore Waters" (in Estuarine and Coastal Marine Science, 1974, pp 349-358) by R.B. Gordon, addresses the question of a lateral movement of spoil at the New Haven Dumping Ground. The sediments considered there, are both coarser and less cohesive than the Thames River materials, and will spread further on impact. Therefore Gordon's results are not directly applicable to Thames River sediments. Even for these less cohesive materials, Gordon indicates that "the density surge carries less than 18% of the spoil outside a circle of 30-meter radius and essentially none beyond about 120 meters." This should represent a conservative upper boundary for such movement of the more cohesive Thames River materials.

68.18 Comment:

Page 124, Para. 5.61

This discussion would be valid only for the period immediately following dredging. Dischargers will continue to pollute the river basin and many pollutants can logically be expected to accrete in depressions such as the newly deepened channel.

68.18 Response:

The EPA and the Connecticut Department of Environmental Protection are actively seeking corrective action from both municipal and private polluters along the Thames River. It is expected, as pointed out in Paragraph 5.34 of the SEIS, that there will be accumulation of pollutants over the next decade, but it is expected that such accumulations will be less severe than those of the past several decades.

68.19 Comment:

Page 126, Para. 5.65

The statement that Cornfield Shoals and the Rhode Island site are containment areas is at odds with the data listed in Figure 6-21 on Page 293.

68.19 Response:

Cornfield Shoals is a dispersal site. The Rhode Island Sound Site is a marginal containment site. The incorrect reference to these sites in Paragraph 5.65 has been corrected, and the designation of the sites in Figure 6-21 made more explicit.

68.20 Comment:

Page 204, Para. 6.142

It does not appear likely that verification of shipboard system within the FORACS range will be restricted by disposal activities at the so called "East" and "West" holes. If such restrictions are anticipated they should be described in more detail.

68.20 Response:

As discussed in Section IV of this volume, conflicts with the FORACS Range can probably be minimized by careful scheduling and routing of barge traffic.

68.21 Comment:

Page 207, Para. 6.147

Finfish monitoring and benthic analyses of the areas (East Hole) are ongoing in an attempt to quantify our knowledge of the location as an alternate disposal site and to nationally assess finfish stock size. Neither study would be seriously impacted by disposal at this site and, as we have monitored it for such a broad period of time, further monitoring might provide additional insights into impacts of open-water disposal of polluted materials.

68.21 Response:

The Navy maintains that the monitoring efforts at the New London Dumping Ground is a State-of-the-Art effort as concerns the effects of dredge material disposal into the marine environment. In order to understand the full consequences or long-term effects (if any) of dredge material disposal, a continuing data base must be developed at one location. Unlike East Hole, the data base at New London has been developed over a period of years and represents a valuable contribution to the State-of-the-art. Any interruption of the research or continuing data base at New London would seriously impact on a substantial research investment.

It also should be pointed out that the Navy and the Corps of Engineers have jointly funded studies to assess the physical and biological characteristics of East Hole as concerns dredge material disposal and is not funding any studies with regard to nationally assessing finfish stock size.

68.22 Comment:

Page 270, Para. 6.287

The data presented by Morton, Cook and Massey in their study of the "East" hole should be reviewed, particularly in regard to the National Marine Fisheries Service data regarding sediment samples some of which were up to 86 percent clay size for finer materials.

Those samples were gathered as part of our assessment of the "East" hole as a possible alternative disposal site and tend to indicate that deposition is actively occurring.

68.22 Response:

The sample (reported as PE-18 in the MACFC East Hole Final Report (Appendix N) indicates that the value of 86% clay size or finer is for the portion of the core 0.25' - 1.8' below the surface. The sediment from the surface to 0.25' has been characterized, in "Bottom Sediment Sample Test Results, Block Island - 1" New England Division Corps of Engineers, as a dark gray gravelly clayey sand. The sample description reported in the NMFS report was not for the surface sediment, but redescribed underlying clay deposits. These samples may in fact indicate a conclusion opposite to that of the NMFS, namely that erosion may be indicated at East Hole due to the lack of sediment which has accumulated on top of the underlying glacial clays. Further details of surface sediments at East Hole are presented in Section IV of this volume. No detailed sediment sampling was done by Morton, et al., nor are any detailed sediment results presented in their report (See Appendix N).

68.23 Comment:

Section 11 - RATIONALE FOR PERMIT ACTION, NEW ENGLAND DIVISION, CORPS OF ENGINEERS, WALTHAM, MASSACHUSETTS

It should be a fact that availability and review of all pertinent data regarding the scope and magnitude of dredging in the Thames River basin is available to the Corps of Engineers. Such action would insure the best possible response after careful assessment of all available data and reflect the opinions of on-site investigators as well as those charged with managing resources which might be adversely impacted by the disposal of approximately 5.3 million cubic yards of dredge spoil materials over the next ten years.

68.23 Response:

The comment is noted. All available data is presented in this Supplement and will be provided to the Corps of Engineers for use in their decision making process under the Federal Water Pollution Control Act.

69.0 ADVISORY COUNCIL ON HISTORIC PRESERVATION

69.1 Comment:

Thank you for your letter of July 14, 1976, containing additional information on the U.S. Department of the Navy's proposed dredging of the Thames River channel.

The Advisory Council has reviewed this additional information and determined that it adequately responds to the concerns raised in our earlier July 7, 1976, letter. Therefore, we have no further comments to make with respect to your draft supplement to the final environmental impact statement for this project.

69.1 Response:

The comment is noted.

[Note to reviewers: The additional information alluded to, was a copy of a letter, Comment 63.0]

70.0 UNITED STATES DEPARTMENT OF COMMERCE

70.1 Comment:

para 3.14 The interim report cited does not conclude that no adverse effects have been detected, but that affected (which may be adverse, such as turbidity increases or burial of fauna) have been localized. The statement of "no adverse effects" also appears elsewhere in the SEIS.

70.1 Response:

Paragraph 3.14 has been revised to read "unacceptable adverse affects".

The Navy maintains that the MACFC monitoring reports indicate that no unacceptable adverse effects have been detected as a result of dredging and disposal operations either in the Thames River or at the New London Site. U.S. Army Corps of Engineers Permit # CT-LOND-74-63 outlines specific monitoring criteria and requires that a monitoring and effects study for the Navy dredging and disposal operations be initiated. If adverse effects of any consequence had been detected or the Navy operations found in violation of the permit criteria, the Monitoring contractor would have immediately notified the Division Engineer.

70.2 Comment:

Table 3.1 and elsewhere. Phase II sediments are never directly compared with those of Phase I. This comparison is necessary for an estimation of differential effects.

70.2 Response:

See Response 25.8 and 68.2.

70.3 Comment:

para 3.37 "Except for volatile solids (and perhaps organics, as presented on p. 30), all consitituents were found to be more concentrated in the top strata". One consistently loses sight of this fact, which is critical in assessing or predicting impacts. Surface spoils from Phase I also exceeded EPA criteria for several parameters - yet heavy metals in dumpsite seston, sediments and lobsters have not increased markedly, and recolonization of the spoils has not been greatly inhibited. The dilution of contaminated spoils with large quantities of older, cleaner, cohesive materials is probably responsible for this. This berthing areas to be dredged last. (Unfortunately, the SEIS does not go into adequate detail as to changes in contaminant concentrations with depth in the sediments).

70.3 Response: See Response 56.5.

70.4 Comment:

para 3.54 "Provisions are being made, however, to incorporate water column lead analysis into the on-going monitoring program". This and several other statements imply that both monitoring and planning for further studies are underway. MACFC's monitoring (sediments and benthic macrofauna) officially ended in October 1975. All presently funded monitoring will end by October 1976. MACFC did submit a re-proposal to the Navy in February 1976, but MACFC knows of no subsequent planning of continuation studies or what they will include. Same comment re para 5.54 "...Future monitoring studies...will include cage experiments."

70.4 Response:

As noted in Paragraph 1.08, the Navy will continue monitoring at the site ultimately designated for the Phase II materials.

70.5 Comment:

para 3.60 and 3.63 Bathymetric surveys "have shown initial settling and spreading shortly after dumping; however, the pile now seems to have stabilized". This is a question of interpretation. The " initial settling and spreading", which apparently included the leveling of the peak of the spoil pile (which had extended upward past the 50' contour), is probably to be expected and not a cause for alarm, although it does bear on the SEIS contention that 40 feet is the minimum containment depth at New London.

However, comparison of February and August 1975 bathymetrics shows that the northwestern half or so of the "plateau" of spoils went from 58 to 60 foot depths between these two surveys; between the August and September 1975 surveys depths over about half of this northwest portion of the pile again increased, from 60 to 62 feet. These changes could be attributed to one or more of 1) the ± 2 ft accuracy of the system; 2) calibration with a tide guage located in the river, some distance from the disposal area; 3) erosion; 4) compaction. Until these possibilities are resolved, statements on containment/dispersal are inconclusive.

It is interesting to note that the bathymetric surveys repeatedly detect the presence of a mound (presumably from earlier spoiling) reaching to within 36 feet of the water surface, toward the NE corner of the dumping ground. Dr. Stewart of the University of Connecticut has reported this mound to consist of quite soft sediments under a layer of coarser materials. This could represent a lag deposit, and the fact that the mount still exists may be the best indication available of the long-term fate of spoils in the dumping ground. Also worthy of consideration is the point raised at the Groton hearings that past dumping (approximately 6,000,000 cu yd over the past 20 year, according to the FEIS) has had no obvious effects on the area.

70.5 Response:

The comment is noted. Section IV of this volume addresses the concerns expressed in the above comment. Section IV also contains further discussion of the relic spoil material.

70.6 Comment:

para 3.62 discusses average friction velocities as being too low to erode the spoils, when maximum observed velocities should be considered.

70.6 Response:

As discussed in Section IV of this volume, maximum observed velocities at New London and East Hole are both insufficient to cause erosion of Thames River seidiments.

70.7 Comment:

para 3.64 similarily deals with the 90% of the waves which are six feet or less, whereas the 10% which are larger are the waves with which we should be concerned. Also, the SSMO Zone 6 data, with peak waves of 26-32 feet, may not be applicable to the New London area. Yet most of the site capacity calculations are based on these data.

70.7 Response:

Very detailed consideration of storm waves is presented in Section IV of this volume. It should be noted that precisely calculated peak waves for the New London Site are similar in size to the 90% waves reported for SSMO Zone 6.

70.8 Comment:

para 3.65 MACFC has not made the statements, attributed to us, that the different benthic assemblages reported were found in natural sandy-silts versus dredge spoil sediments, and that the spoils support a diverse group of organisms.

70.8 Response:

The material in paragraph 3.65 is the Navy's observations based on MACFC information. MACFC was not quoted, but rather was listed as the source of the data.

70.9 Comment:

para 3.66 may be somewhat slanted: "Fishermen specifically avoid the site itself and the surrounding area... Sport fishing...is common but certainly not as extensive as in other nearby areas, such as the Race". There are probably very few sites on the entire coastline as popular as the Race for sport fishing.

70.9 Response:

The comment is noted (see Section IV of this volume).

70.10 Comment:

para 5.19 If berthing depths at EB were increased to -39 feet, "a substantial increase in the quantity of dredge spoils from these projects must be considered." Since -39 feet seems to be the necessary depth for the new subs, which require access to EB, shouldn't this increase in amount of spoils to be considered in the SEIS?

70.10 Response:

See Response 68.10.

70.11 Comment:

para 5.34 Phase II dredging will involve more spoils than did Phase I; when non-Navy work is included, the total is much higher than for Phase I. Whether physical impacts will be similar to those of Phase I is not known, and it should not be stated as fact that impacts will be similar. The Corps dredging in 1980 would probably be too late to provide an effective "cap" for spoils dumped in 1977.

70.11 Response:

As noted in paragraph 5.37, the future use of Corps dredged material to cap earlier sediments is speculative. Additionally, paragraph 5.34 speaks to dredging impacts, not to disposal impacts, which are treated in paragraphs 5.39 through 5.76.

70.12 Comment:

para 5.57 "...Following each (disposal) event, (biological) recovery will begin almost immediately." - again assumes impacts of Phase II will be similar to those already observed.

70.12 Response:

Paragraph 5.57 of the SEIS speaks to the generic impacts of projects proposed for the Thames over which the Navy has no control and concerning which there are few data. Previously observed data suggest that impacts will be similar. The effects of Navy Phase II disposal are considered in paragraph 5.39 to 5.48.

70.13 Comment:

para 5.59 Microbiological findings did indicate that river outflow was exerting contamination pressure on the disposal area, but made no predictions about future influences.

70.13 Response:

No predictions are credited to Graikoski, *et al.* in paragraph 5.59. The data do suggest that future conditions may be similar, at least until clean-up of the Thames is completed.

70.14 Comment:

para 5.61 "Preliminary indications from the Navy monitoring studies would suggest that the effects of dredging and spoiling at New London may be beneficial to the enhancement of local fisheries." MACFC has not made such a statement; this is an interpretation (as with the microbiological topic above) which could be true, but might give the reader the false impression that the monitoring survey is responsible for these remarks. In the same veil, para 5.73 implies that the monitoring study has reported recolonization in the river, which it hasn't.

70.14 Response:

The statement made in paragraph 5.61 is a Navy interpretation based on current MACFC data. Paragraph 5.73 is not attributed to MACFC and represents the Navy's conclusions from several data sources.

70.15 Comment:

para 5.67-5.68 Long-term cumulative biological and chemical impacts, which are of paramount importance, are each discussed in a short paragraph. While it is true that present knowledge doesn't allow a definitive statement concerning these impacts at New London, the many studies concerning other disposal areas, natural population fluctuations, acclimation of organisms to contaminant loads, etc. should at least be touched on to give some indication of possible impacts.

70.15 Response:

Section III of this volume has been prepared in response to this and other comments on long-term effects of dredged material disposal.

70.16 Comment:

para 6.26 It is one-sided to present a list of dubious objections to creating marshes from spoils, while no positive attributes of marshes are mentioned.

70.16 Response:

Paragraph 6.26 makes no judgment as to the value of marshes. Rather, it speaks to the possibility of constructing one at or near New London as a method of disposal for the Navy Phase II materials.

70.17 Comment:

para 6.35 et seq. The discussion of land disposal shows lack of imagination in ruling it out since not all the Navy spoils could be accommodated. What about just land-disposal for the most contaminated materials? Many sites are ruled out on the possibility that they'll be used by EB, Coast Guard, etc. - could not a more definite indication of site availability be obtained from these other groups? Cost seems to be emphasized to a much greater extent than it was for the ocean disposal sites, even though the cost estimates given for three of the land-disposal sites considered and several other sites not considered by the FEIS or the Maguire study ($8-$12/cu yd) were comparable to Maguire's estimate for deep-water disposal ($10.14/cu yd).

Cost becomes less important if land disposal is only used for the small fraction of spoils that is highly contaminated.

Also not discussed adequately are the ideas of dredging the most contaminated sections first, removing surface spoils first, or considering times of year which would cause least impact. How about capping the pile with materials from the floating drydock area? This area must be dredged to -59 feet, so the bulk of its estimated 154,000 cu yd of spoils should be fairly cohesive and uncontaminated. There is no guarantee that these procedures would lessen impacts, but where the possibility exists, it should be explored.

70.17 Response:

See Comment 7.0 and Response 14.3. Response 28.15 applies equally to capping of more polluted material with materials from the floating drydock area (pierside sediments).

70.18 Comment:

para 6.82 says Dehlinger et al. "postulate that the sediments of Long Island Sound are acting as a significant sink for copper, zinc and other metals." But p. 3 of the final report cited states that "...the eastern Sound is not likely to be a sink for heavy metals or other pollutants..."

70.18 Response:

The comment is noted. See Comment and Response 61.21.

70.19 Comment:

para 6.84-6.85 Sediment grain size and skewness should be used with caution in interpreting the containment/dispersal nature of a site. Present sediments can be related to faunal assemblages present, suspended material concentrations in the water column, or historical as well as present sedimentary regimes.

70.19 Response:

As pointed out in paragraphs 6.363 to 6.375, all of these factors were used in determining the retention ranking of the sites.

70.20 Comment:

para 6.146 University of Connecticut is not involved with NOAA in East Hole studies.

70.20 Response:

The paragraph has been amended in light of this comment.

70.21 Comment:

Figure 6-11, showing research sites only in Block Island Sound, is misleading.

70.21 Response:

The only major research activity in the eastern end of Long Island Sound focuses on the New London Site and its monitoring program. Such research was considered "an Other Use" which would constrain future disposal. Hence, the New London Site was not shown on Figure 6-11.

70.22 Comment:

para 6-268 and 6-288 Capacities for containment site 3 and East Hole are based on filling to the level of the surrounding terrain, while for other areas the piles are allowed to rise as much as 40 feet above the surrounding terrain.

70.22 Response:

The capacity of these depressions is sufficient, even at the level of the surrounding submarine topography, to accomodate all Thames River dredge material disposal over the next decade. Other sites are on flatter terrain, and depth limitations were established to allow intercomparisons to be made.

70.23 Comment:

para 6-285 Note Nalwalk et al. figure of 2.0 fps for maximum currents at 165 feet on the northern side of East Hole. Thus if the hole were filled to 150 feet, the critical erosion velocity of Thames River sediments could be exceeded by a good deal. Note that para 6-287 states "...it is not possible to predict the fate of dredge spoil" dumped at East Hole. "...moderately well sorted and sand-sized sediments or an area of active sediment transport...a marginal containment site". This is noted not to criticize the SEIS but to question the suitability of East Hole as a disposal site.

70.23 Response:

Section IV of this volume considers the relative containment properties of East Hole. It seems that it might offer such properties, but there are no observations of disposal there (there has been none) to confirm or deny its relative containment ability.

70.24 Comment:

para 6.305 Dumping in ebb tides in dispersal areas to avoid shoreward movement of contaminants could be futile. Much of the material will still reach the bottom, where it will be influenced by flood as well as ebb tides.

70.24 Response:

All dispersion sites were eliminated from the analysis for this and other reasons. (See paragraphs 6.371 to 6.375)

70.25 Comment:

para 6.363 disagree with New London being given highest containment rating based on sediment analysis (newly-dumped spoils?) and 1.7 fps bottom velocity.

70.25 Response:

See Section IV of this volume for a reconsideration of the relative containment properties of the New London Site.

70.26 Comment:

para 6.376 Containment capacity should perhaps be given more emphasis and considered in the context of spoiling past 1985, regional dumpsites, etc. (though admittedly this analysis has not been court-ordered). Again, basing capacities on filling holes at some sites, and creating large "blocks" of spoil at others, is invalid.

70.26 Response:

The Corps of Engineers is responsible for long-term management of dredged material disposal. The brief consideration of capacity indicated that all of the relative containment sites would accept all Thames River dredged material between now and 1985. Beyond then, the future is too uncertain to allow even cursory consideration. See also Response 70.22.

70.27 Comment:

para 6.378 Relating site suitability to faunal diversity is meaningless. The least diverse systems may be the most productive ones, and thus most important to man's resources. Diverse assemblages may be more or less tolerant to disposal-related stresses.

70.27 Response:

As stated in paragraph 6.378, relating site suitability to faunal diversity is a simple approach to a complex system. When data are limited, estimates must be made. Section IV of this volume contains a more complete discussion of the biology of two sites for which there is much information: New London and East Hole.

70.28 Comment:

para 6.386 Browns Ledge is considered an important area because over 120 invertebrate species have been found there. An early Quarterly Report listed over 150 species at New London. More recent information (not available at time of SEIS writing) shows upwards of 200 species at New London, and 187 at East Hole. Numbers of species are of course related to sampling intensity in an area.

70.28 Response:

The comment is noted.

70.29 Comment:

para 6.398 et seq. Site Use Other Than Fishing includes fishing in the rankings of Munitions, Acid Barge and Browns Ledge sites. Only actual Other Uses listed (proximity to submarine anchorage; BIFI range) may not be sufficient for a clear discrimination between sites.

70.29 Response:

The Other Use rankings for Munitions, Acid Barge and Browns Ledge mention fishing only in passing. It served to separate them from sites with no use, not even fishing.

70.30 Comment:

para 6.416-6.417 Biological factors are used as indicators of fishing use and are given an overall importance of 20%, whereas the fishing use itself is only given 15%.

70.30 Response:

This is considered to be proper, in that separating fishing and biology gives appropriate weight to both aspects of this resource. No heavier combined weight for the two categories seemed justified.

70.31 Comment:

para 6.419 "...the greater the known regulatory interest...the less danger of environmental damage", so regulatory interest is considered a plus. The other side of this, as espoused by the East Hole proponents, is that a site is easier to manage with fewer regulatory interests.

70.31 Response:

The Navy still feels that regulatory interest should be viewed as a plus for a disposal site.

APPENDIX M

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS
Commander (e)
Third CG District
Governors Island
New York, NY 10004
(212) 264-4900

11460
18 MAY 1976

From: Commander, Third Coast Guard District
To: Commanding Officer, Northern Division, Naval Facilities Engineering Command (Code 09BE), Philadelphia, PA 19112

Subj: Comment on Draft Supplement to Final Environmental Impact Statement, "Dredge River Channel"

1. Thank you for the opportunity to comment on your Draft Supplement. Our only comment is to point out to you that we have, on 9 April 1976, withdrawn our application for Corps of Engineers dredge permit for the 190,000 cubic yards project at Thames River Shipyard. This should affect your table 5-1 and paragraph 5.18. We now anticipate dredging about FY-1980 approximately.

2. This action in no way alters the Academy's plans for maintenance dredging, as reported (in the same places) in the Draft Supplemental.

D. E. PERKINS
Chief of Staff

Copy to:
Superintendent, U. S. Coast Guard Academy

SOUTHEASTERN CONNECTICUT
REGIONAL PLANNING AGENCY

139 Boswell Avenue, Norwich, Connecticut
(203) 889-2324 06360

26 May 1976

Commanding Officer
Northern Division
Naval Facilities Engineering Command
Philadelphia, Pennsylvania 19112

Dear Sir:

The Reference Committee of the Southeastern Connecticut Regional Planning Agency has reviewed the Supplement to the Final Environmental Impact Statement on the Thames River Dredging Project.

The Committee voted to maintain its original position, which supported the dredging project, and which stressed the importance of choosing an environmentally acceptable disposal site.

The Committee notes that the discussion of the alternative dumping sites considered as well as the evaluation of those sites as presented in the Supplement to the EIS indicate that the New London Dumping Ground is the preferred dumping location.

Based on the analysis given in the Supplement, the Committee voted to make no further comments on the project.

Sincerely,

Stephen Wolinski

Stephen Wolinski
Chairman, Reference Committee

SW/al

(203)443-8332

Chamber of Commerce
Southeastern Connecticut

105 HUNTINGTON STREET • ONE WHALE OIL ROW • NEW LONDON, CONNECTICUT 06320

May 26, 1976

Division Engineer
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Sir:

The Chamber of Commerce of Southeastern Connecticut would like to go on record that it is in total support of the planned program of dredging the Thames River to the vicinity of the U. S. Naval Submarine Base, New London, and that it is in support of the disposal of dredge spoils at the "New London Dumping Ground."

Members of the Chamber have read and evaluated the Draft Supplement to Final Environmental Impact Statement on the Dredging of the River Channel, dated April 1976, and have concluded that the information presented therein represents a thorough, scientific, and fair evaluation of the possible effects of spoil disposal at a reasonable number of known alternative sites, and an adequate evaluation of the effect of spoil disposal requirements from other known and projected dredging in the area in the next decade. We have also concluded that use of the New London Dumping Ground will not have an adverse environmental impact, other than temporary and minor, and will not adversely affect the sport or commercial fishing industries in the area.

The Chamber of Commerce of Southeastern Connecticut believes that continued operation of the U. S. Naval Base at Groton is essential to National Defense, and is of major economic importance to the region. It believes that the requested dredging is essential to this continued operation, and also would be beneficial to shipping in the New London Harbor. Finally, it believes that the dredge spoils can be safely disposed of at the "New London Dumping Ground."

2 JUN 1976

In consequence, the Chamber of Commerce of Southeastern Connecticut urges the reinstatement of the suspended Navy permit to dredge 2,800,000 cubic yards of material from the Thames River and dispose of it as requested at the "New London Dumping Ground," as being in the public interest.

Yours truly,

Wilfred J. Benoit

Wilfred J. Benoit
Chairman of the Board

WJB:dq

Robert K. Vibert, Jr.
Harrison's Landing
Quaker Hill, Connecticut 06375

May 27, 1976

Colonel Ralph T. Garver
U. S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Garver:

At a recent meeting, I was an interested recipient of a briefing regarding the supplemental Environmental Impact Study pertaining to the Thames River dredging project and the proposed disposal of spoil at the New London Dumping Ground in Long Island Sound.

As a result, I wish to go on record in support of the proposed resumption of dredging on its merits. I believe the Navy has fairly and adequately studied this matter and it should go forward without delay.

In addition, it is vitally important to the area's economy to maintain the channel in the Thames to avoid losing any part of the Submarine Base.

Sincerely yours,

2 JUN 1976

R. K. Vibert

Robert K. Vibert

RKV/dbf

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
NORTHEASTERN AREA, STATE AND PRIVATE FORESTRY
6816 MARKET STREET, UPPER DARBY, PA. 19082
(215) 596-1671

8400
May 27, 1976

Commanding Officer
Northern Division
Naval Facilities Engineering Command
U.S. Naval Base
Philadelphia, Pennsylvania 19112

Refer to: Supplement to
Final Environmental Impact
Statement, Dredge River
Channel, Groton, CT

Dear Sir:

We have reviewed the above Draft Supplement and consider direct and indirect effects on vegetation to be minimal since spoil is to be dumped at sea.

Thank you for the opportunity to review the document.

Sincerely,

/s/ Lewis S. Frame

DALE O. VANDENBURG
Staff Director
Environmental Quality Evaluation

NAVY LEAGUE of the UNITED STATES
(FOUNDED 1902)
The Civilian Arm of the Navy
EASTERN CONNECTICUT COUNCIL

HELCO, P.O. Box 591
New London, Ct. 06320
May 27, 1976

Colonel Ralph T. Garver
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Mass. 02154

Dear Colonel Garver,

At the meeting of our Board of Directors on Friday, May 21st, we received a comprehensive briefing from one of our own members on the supplemental Environmental Impact Study pertaining to the Thames River dredging project and the proposed disposal of spoil at the New London Dumping Ground in Long Island Sound.

Our Directors voted unanimously to support the proposed resumption of dredging on its merits, and I submit the enclosed resolution for your consideration in evaluating this proposal.

We trust that this project will be favorably acted upon.

Sincerely,

Robert K. Vibert, Jr.

Robert K. Vibert, Jr.
President

2 JUN 1976

NAVY LEAGUE of the UNITED STATES

(FOUNDED 1902)

The Civilian Arm of the Navy

EASTERN CONNECTICUT COUNCIL

RESOLUTION:

The Officers and Directors, Eastern Connecticut Council, Navy League of the United States, in meeting May 21, 1976, and after consideration of the issues involved formally resolved:

1) Whereas, dredging of the Channel of the Thames River from its mouth to the U. S. Naval Submarine Base, New London is required to permit the use of this Base to support SSN688 Class nuclear attack submarines, and

2) Whereas, use of a Submarine Base in support of these submarines is an essential part of the national defense, and moving the New London Base to another location, if such exists, unacceptably expensive, and

3) Whereas, dredging of the Thames River Channel will provide benefits to commercial shipping as well, and

4) Whereas, no adverse environmental effects, other than transitory or minor have been observed in the first increment of dredging (from the mouth of the river to the railroad bridge) in the course of the environmental monitoring program carried out under the original Corps of Engineers permit.

In addition, the Officers and Directors resolved that:

1) Whereas, the Draft Supplement to the Final Environmental Impact Statement on the Dredging of the River Channel, dated April, 1976, indicates that full consideration was given to alternative ocean disposal sites, as well as land disposal sites, and

2) Whereas, the potential requirements of disposal of spoils from anticipated Corps of Engineering maintenance dredging and dredging in support of commercial enterprises were taken into account in this Draft Supplement, and

3) Whereas, a judicious and thorough evaluation in the Draft Supplement showed the "New London Dumping Ground" to be the preferred site for disposal, and

4) Whereas, the anticipated adverse environmental impact on the "New London Dumping Ground" from disposal of the spoil from the second increment of dredging, and other anticipated dredging, was shown in the Draft Supplement, on the basis of study, and of the results

of previous monitoring to be minimal and transitory, and to constitute no detriment to fishing in the area.

Therefore, the "New London Dumping Ground" is a suitable area for the disposal of spoils, and should be used for the purpose, if the Corps of Engineers designates it for that purpose.

The Officers and Board of Directors, Eastern Connecticut Council, Navy League of the United States urges reinstatement of the suspended dredging permit.

GENERAL DYNAMICS
Electric Boat Division
Eastern Point Road, Groton, Connecticut 06340 • 203 446-5960

June 2, 1976

Commanding Officer, Northern Division,
Naval Facilities Engineering Command
Philadelphia, Pennsylvania, 19112

Attention: LT R. Norris III

Subject: Supplement to Final Environmental Impact Statement

Reference: (a) U.S. Navy Letter, Same Subject, Code 09BE, Dated 26 April 1976

SIR:

1. Many thanks for the copy of the Supplement to the FEIS "Dredge River Channel". The material concerning General Dynamics, Electric Boat Division included appears to be in proper perspective.

2. A minor modification in emphasis concerning the potential for use of the "Hempstead Farms" area as a disposal site (sections 6.38, 6.39 and 6.51) may be in order. C. E. Maguire, Inc. in their "Dredge and Disposal Study" (Supplemental FEIS reference 40) has indicated the possibility of the creation of a new 324,000 c.y. disposal area at Hempstead Farms. Although this is a theoretically acceptable site, Electric Boat Division has not considered it to be practicable for several reasons:

   a. The site is contiguous to a designated inland wetland in the Town of Waterford and a major engineering and construction effort would be required to guarantee that no impact would occur due to seepage from the disposal area into the wetland. At this time we cannot predict the success of this engineering.

   b. During the acquisition of COE permit CT-LOND-75-23 which ultimately authorized disposal of 7500 c.y. of dredged material within the dike at Hempstead Farms, both Connecticut DEP and Town of Waterford resisted development of new disposal sites adjacent to the inland wetland and specifically insisted that disposal be made only at the existing disposal site.

   c. The Hempstead Farms site has been zoned for industrial use. Development of additional spoils area on prime waterfront land seriously jeopardizes the intended site use and radically reduces the property value of the total 220 acre site. This economic loss has not been evaluated in the C. E. Maguire study

Very truly yours,

J. N. Spillane

J. N. Spillane

JNS:dan

CITY OF NEW LONDON
CONNECTICUT

June 8, 1976

Lt. L. R. Norris, III
Department of the Navy
Northern Division
Naval Facilities Engineering Command
Philadelphia, Pennsylvania 19112

Dear Lt. Norris:

Reference is made to the U.S. Army Corps of Engineers/U.S. Navy Public Hearing, Thames River Dredging and Spoils Disposal, to be held in Groton, Connecticut on Thursday, June 10, 1976, at 7:30 p.m., Fitch Junior High School.

Please find enclosed herewith recommendations of the City Planning Board and the Development Coordinator of the City regarding this dredging program.

Please also be advised that at the June 7 meeting of the Council of the City of New London the Council went on record as having no objection to the dumping of spoils in the same location as last year with regard to part 1. of your program.

Very truly yours,

C. Francis Driscoll
City Manager

D:b
Enclosures:

cc: Lt. L. R. Norris, III, c/o Principal
Fitch Junior High School

NEW LONDON CITY PLANNING BOARD / CDAP AGENCY

MUNICIPAL BUILDING • NEW LONDON, CONNECTICUT 06320 • (201) 443-2861 EXT. 314

WALDO K. CLARKE, President
THOMAS E. MOORE, Advisor
NANCY L. JACKSON, Secretary

May 17, 1976

Mr. C. Francis Driscoll
City Manager
Municipal Building
New London, Conn. 06320

RE: Public Hearing to be Held on June 10 in Groton Concerning Dredging the Thames River

Dear Mr. Driscoll:

The Planning Board, at its regular meeting on May 13, 1976, voted unanimously (4 to 0) that, based upon the plans and information available at this time, no cause for objection is found.

Very truly yours,

Nancy L. Jackson

Nancy L. Jackson, Secretary
City Planning Board/CDAP Agency

MAY 17 1976

CITY OF NEW LONDON
CONNECTICUT

INTERDEPARTMENTAL MEMORANDUM

DATE: May 25, 1976

TO: City Manager

FROM: Philip W. Michalowski P. Michalowski

SUBJECT: THAMES RIVER DREDGING

In response to your communication and the notice of public hearing concerning the completion of the dredging of the Thames River, I think the City should go on record in support of this activity. Past fears as to the environmental damage that would be caused by this project and in particular the use of the New London dumping ground has not materialized during the first phase of the project. From all monitoring activities of the project by the various governmental and scientific agencies no serious environmental problems have been identified. In light of this intense scrutiny of the first phase of this dredging operation and the importance of the Navy community in the Southeastern Connecticut economy, the City should endorse the project in order to expedite its early implementation.

PWM/tdk

MAY 27 1976

NAVAL ELECTRONICS LABORATORY CENTER
271 CATALINA BOULEVARD
SAN DIEGO, CALIFORNIA 92152
714-225-6011
AUTOVON 933-1011

IN REPLY REFER TO:
FORACS IV:WPE:jf
11460
Ser 6900-140
8 June 1976

From: Commander, Naval Electronics Laboratory Center
To: Chief of Operations, U.S. Army Corps of Engineers, Northern Division, Waltham, Mass. 02154

Subj: New London Dredge Project; alternate disposal sites

Ref: (a) NELC ltr ser 6900-159 of 23 SEP 74

1. The work-load of the FORACS IV Range located on Fishers Island, New York has increased approximately 25% in the last year and is expected to be operating at this increased level for the next several years. Any increased traffic thru this area would be detrimental to on-range testing from 2 aspects: (1) vessel safety, since approximately 50% of the ships on-range are submarines operating submerged or at periscope depth and (2) acoustic interference from vessel traffic.

2. Our position, as stated previously in reference (a) is unchanged in that selection of either the East or West Holes as a dumpsite would have an adverse impact on the operations of FORACS and we therefore oppose selection of these alternate disposal sites.

W. P. Etter
W. P. ETTER
By direction

Copy to:
→ NORDIVNAVFAC (09BE)
NUSC (NLON LAB)
NAVMAT (04)
NAVFAC (PC-4)
NAVSEA (06H4)

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

THE CITY OF GROTON
CONNECTICUT

295 MERIDIAN STREET
06340

DONALD B. SWEET
Mayor
MARJORIE I. STATON
Treasurer
JAMES F. BRENNAN, JR.
City Attorney
Address all Communications to
JOHN J. DeLAURA
Clerk

Councilors
WILLIAM O. THOMSON
(First Senior)
RICHARD J. STARK
(Second Senior)
ROBERT ALLINGHAM
PETER J. HOMER
JAMES H. McGILL
ROBERT L. ZULIANI

June 9, 1976

Department of the Navy
Northern Division
Naval Facilities Engineering Command
Philadelphia, Penn. 19112

Dear Sir:

At the regular meeting of the Mayor and Council held June 7, 1976, it was voted:

"That the Council go on record supporting the U. S. Navy's dredging of approximately 2,800,000 cubic yards of material from the Thames River and subsequent spoil disposal at the New London Dumping Ground in Long Island Sound."

Very truly yours,

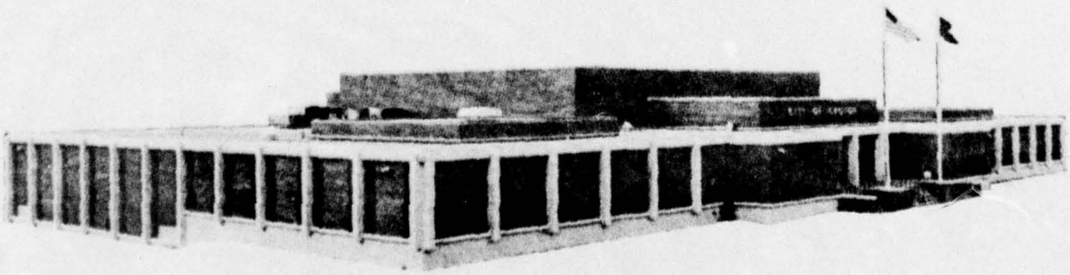
THE CITY OF GROTON

John J. DeLaura

John J. DeLaura
Clerk

JJD/ncs

cc: Division Engineer, New England Division,
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Mass. 02154



UNITED STATES OF AMERICA
Department of the Army
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

PUBLIC MEETING

on

THAMES DREDGING,
DISPOSAL PROJECT

Greenport High School
Southold, Long Island,
New York

Wednesday, June 9, 1976
7:30 o'clock p.m.

354

BEFORE:

COLONEL RALPH T. GARVER, Deputy Division Engineer

PRESENT:

Mr. V. L. Andreliunas, Chief, Operations Division

Mr. Morgan R. Rees, Chief, Permits Branch

Mr. Frank V. Bonsagni, Office of Counsel

Mr. Walter F. Mackie, Public Affairs Officer

I N D E X

E X H I B I T S

P R O C E E D I N G S

COLONEL GARVER: The hearing is called to order.

I am Colonel T. Garver, Deputy Division Engineer of the New England Division, Corps of Engineers. My office is located in Waltham, Massachusetts. Principal members of my staff with me this evening are: Vyto Andreliunas, Chief, Operations Division; Morgan Rees, Chief of the Permits Branch; Frank Bonzagni, Office of Counsel, and Walter Mackie our Public Affairs Officer.

For the benefit of the news media, Mr. Mackie has a news kit which contains 356 copies of these remarks. The news media can save themselves some writer's cramp by seeing Walter for a copy if he hasn't already given you one.

This hearing is jointly sponsored by the U. S. Army, Corps of Engineers and the U.S. Navy.

Representing the Navy this evening, we have Lt. L.R. Norris, III, Environmental Protection Coordination Officer of the Northern

Division, Naval Facilities Engineering Command; Mr. Steven C. Davis, Project Director, Jason Cortell & Associates; Mr. Robert N. Reid, Chief, Coastal Ecosystems Investigations, Middle Atlantic Coastal Fisheries Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce.

The Corps is sponsoring the hearing this evening under provisions of Section 404 of the Federal Water Pollution Control Act Amendments of 1972 and Section 10 of the River and Harbor Act of 1899, and persuant to provisions of the Corps Permit regulations, Title 33, Code of Federal Regulations 209.133, published in the Federal Register on 16th of January, 1975.

Our purpose this evening is to solicit public comment to assist the Corps in reaching a decision on whether it is in the public interest to reinstate, modify, or revoke the Navy Permit and consider an additional 553,000 cubic yards of dredging associated with vertical construction as described now in our Public

Notice dated 14 November, 1975.

The Navy is sponsoring the hearing this evening for the purpose of obtaining additional public comment to the Draft Supplement to its Final Environmental Impact Statement originally published in December, 1973.

Also contained in the Supplement are corrections of deficiencies noted in the Court's decision referred to in the announcement of this hearing. The Draft Supplement statement is dated April 1976, and was filed with the Council on Environmental Quality on the 30th of April this year.

A notice of this hearing was mailed on the 7th day of May, 1976, to everyone known by us to be interested in the project. Copies of the Notice and a list of names to whom it was sent are available to anyone who wishes to examine them after the close of the hearing. 358

If there are no objections, I will dispense with the reading of the Public Notice, and enter it into the record as Exhibit No. 1.

(Public Notice was marked as Exhibit No. 1.)

When you came in this evening you were given a card to fill in, or if you weren't given one you should pick one up at the table over here. Please fill it in giving your name, address and whom you represent. This information is important to us because it gives us a record of those individuals and organizations who are interested in this proposal. Please be sure to turn in the card before you leave the hearing, and if you wish to speak please so indicate on the card and turn it in right away, so that I may be alerted to call on you in turn.

The hearing will be conducted informally. All who desire may express their views on the Corps permit, on the Navy Supplement to the Final Environmental Impact Statement. They will all be given an opportunity to speak. As this is your right, it is also your right to be heard.

I ask that there be no interruptions for rebuttal. If you have any questions for anyone you may address the questions through me when you have the floor and I will ask the individual if he desires to comment.

When you address the hearing, please come forward to the microphone and speak loudly enough so that everyone in the hall may hear you including our Stenographer over here. A verbatim transcript is being made to allow detailed, methodical review of all matters presented this evening. A copy of the transcript will be available for review by any of you in our office at Waltham, Massachusetts. However, if you desire a personal copy of the record of this hearing, arrangements may be made during a break or after the hearing with the Stenographer from whom we will purchase our copy. You may purchase a copy just as the same as the one we will receive at your own expense.

Also, when you address the hearing, please state your name and the interest you represent. Again, if you represent yourself, merely say so.

Following tonight's hearing, the record will remain open for 10 days. If you wish to add anything to this record, please submit it in writing to our Waltham office within those 10 days.

300

Everything submitted, either oral or written will become part of the written record. No decision will be made here this evening. The decision relative to reinstating, modifying or revoking the permit for the dredging and disposal activity will be made by the Division Engineer as a result of careful analysis of the entire written record including the information we assemble tonight. Since both oral and written comments will be given the same concern, if you have a long prepared written statement, you can do your friends a favor and merely summarize it orally, submitting the entire statement for the record. If you have additional comments at a later time, we will remain here this evening as long as anyone wishes to speak.

A description of the details of the Navy's project will be made by Lt. Norris and by members of his staff.

After the Navy presentations, I will receive either oral and/or written statements from the following individuals or their representatives in order. First, members of

Congress; the Governor; members of the State Legislature; elected municipal officials; officials of federal agencies; officials of state agencies; officials of local government agencies; and then others and I will call on people in the order in which I received the cards.

After we have exhausted the cards, I will see if any of the rest of you have anything else you wish to say. First Lieutenant Norris.

PRESENTATION BY
LT. L.R. NORRIS, III
ENVIRONMENTAL PROTECTION
COORDINATION OFFICER

LT. NORRIS: Thank you, Colonel Garver. As mentioned by the Colonel, I am Lt. Bob Norris, a Civil Engineer Corps Officer in the Navy. I am the Environmental Protection Coordination Officer at Northern Division, Naval Facilities Engineering Command located in Philadelphia.

I wish to provide you this evening an oral summary of the contents of this document, a supplement to a Final Environmental Impact Statement, which was recently mailed to numerous governmental and local groups for

review and comment. Before I do that, however, I believe it pertinent to provide you with a history of events which preceeded preparation of this Supplement.

On January 9, 1974, the Final Environmental Impact Statement, Dredge River Channel, Naval Submarine Base, New London, Groton, Connecticut dated December 1973, was submitted to the Council of Environmental Quality. This action culminated a two year program by the U.S. Navy to assess the environmental impacts associated with the dredging of nearly 3 million cubic yards to material from the Thames River in order to accomoodate the new SSN 688 class of submarines.

A permit authorizing the U.S. Navy to accomplish the Thames River dredging and designating the New London Dumping Ground as the disposal site was issued by the New England Division, Army Corps of Engineers, on April 29, 1974. This permit contained as a special condition that a comprehensive and monitoring and environmental effects study be conducted at the dredge and disposal areas before, during, and after the dredging effort.

On June 24, 1974, the environmental monitoring and effects survey at the dredge and disposal locations, Thames River Channel and New London disposal site respectively, was commenced by the prime contractor, the Middle Atlantic Coastal Fisheries Center of the National Oceanic and Atmospheric Administration, to comply with the permit and has continued to date. It is the Navy's intention to continue a monitoring survey at the dredge site, the New London Dumping Ground, or any other disposal site, so designated by the Army Corps of Engineers to receive the remainder of Navy project spoil material. The scope and duration of these surveys shall depend upon the conditions and criteria as set forth in the permit.

As required in the funded proposal, quarterly reports are prepared and submitted both of members of the Interagency Scientific Advisory Subcommittee on Ocean Dredging and Spoiling and the U.S. Navy for review.

The Navy in turn has distributed the quarterly reports and/or the abstracts to

numerous interested parties. As of April 1976, five quarterly reports had been prepared and submitted by the Middle Atlantic Coastal Fisheries Center. In January 1976 comments concerning the content and/or the scope of the Navy's first year of monitoring were invited from numerous federal, congressional and state and local interests. As of this hearing, no comments have been received.

A contract for accomplishing the first increment of Thames River channel dredging was awarded on June the 26th, 1974, The limits of this project emcompassed only approximately one-half of the dredging evaulated in the Final Environmental Impact Statement. This increment of Thames River channel dredging was commenced by the contractor in August 1974 using bucket dredge techniques. Transport of the dredged material from the dredged site to the permitted disposal area, the New London Dumping Ground, was accomplished using either 1500 or 1300 cubic yards scows under tow. As was the dredging operation,dumping was monitored by an Army Corps of Engineers' inspector in

accordance with the provisions of the permit.

In August, 1974, the Natural Resources Defense Council and other groups brought suit to prevent the Navy from dumping the dredged material or spoil at the New London dumping site in Long Island Sound. The decision by Judge Blumenfield of the United States District Court, District of Connecticut, determined that the Defendants had complied with the provisions of the National Environmental Policy Act.

The first increment of Thames River channel dredging was essentially complete on June the 30th, 1975. Although sweeping of high spots, dredging of shoals and removal of rock occurred until mid-July 1975. The total quantity of material removed during the first increment of Thames River channel dredging operation has been estimated to be approximately 1.5 million cubic yards.

366

On September the 9th, 1975, the second Circuit Court of Appeals directed the District Court to issue appropriate injunctive relief to prevent further dumping at the New London dump site until certain findings were made under the

Federal Water Pollution Control Act and defects in the Final Environmental Protection Statement were corrected.

An order of November 12, 1975, implementing the Second Circuit opinion directed the Navy to prepare a supplemental Environmental Impact Statement which would first consider the proposed Navy dredging and disposal in the light of the cumulative effects of other similar projects in the New London area, and second, evaluate previously proposed alternative dumping sites in order to select one for use on the basis of clearly stated data and reasoning.

Slide No. 1 --

As I mentioned before, the document under review this evening, a supplement to the Environmental Impact Statement "Dredge River Channel," Naval Submarine Base, New London, Connecticut, dated December 1973, has been prepared in part to meet the specific requirements of the Court order. Address additional dredging requirement not included in the original permit, and reevaluate alternative methods for dredging and disposal.

Slide No. 2 -- In order to insure the operational capacilities of the new SSN-688 class of submarines at its New London Naval Submarine Base, the Navy proposes to continue deepening and widening of the existing channel in the Thames River between the Gold Star Bridge and the Naval Submarine Base. In addition, pier side dredging and dredging of a channel extension in the vicinity of the base is required.

Slide No. 3-- Approximately half of the Thames channel dredging and associated disposal at the New London site was accomplished under a permit issued by the Corps of Engineers prior to the issuance of the Court order referred to earlier. Timely completion of the remaining dredging and disposal is essential to meeting the operational schedule of the SSN-688 class of submarines.

I would like to indicate to you first the area that has been dredged and the area that is pending. This area has been dredged (indicating). This area has not been dredged (indicating). The submarine base is located

here (indicating).

Slide No. 4 -- The total of materials still to be removed is 2,770,000 cubic yards of which all but 190,000 cubic yards are programmed under the Military Construction Programs for 1976 and 1979. Compeltion of the main channel dredging in the Thames accounts for 1,292,000 cubic yards.

Slide No. 5 -- The remainder will come from the Naval Submarine Base, at the piers and in the river channel, as indicated in these areas. This is the so-called second increment of the Thames River dredging.

Slide No. 6 -- Total dredging requirements for the New London area, including private and Corps of Engineers work as well as the Navy projects, amount to a projected 5,300,000 cubic yards through 1985. The date at the bottom is incorrect is incorrect. Thus the Navy requirements addressed here represent about 52 percent of Thames River and vicinity dredging. Careful analysis has shown that the New London Dumping Grounds is the preferred and most environmentally acceptable alternative

for accomodating all anticipated spoil disposal from the Thames River. In addition, the monitoring study has not detected any long-term adverse environmental effects as concerns the first increment of channel dredging and dredged material disposal.

Let us briefly look at the scope of the study which led to this conclusion. Before proceeding, however, it should be realised that the summary as presented here this evening is not a satisfactory substitute for reading the Supplement in its entirety.

Slide No. 7 -- The environmental of the areas to be dredged, including the waters of the Thames and the characteristics of the bottom in the main chennel, and the long term effects of removal of the programmed amount of material by dredging were evaluated. At this point it might be worth noting that the adverse impacts of the dredging per se were judged to be localized in area and of a short term nature. The long term impact on the Thames River environment was deemed to be positive. The removal of large quantities of polluted materials

370

from the bottom and the corrective measures now being implemented by industries and municipalities, under orders from the Environmental Protection Agency, are expected to continually improve the water quality and fisheries resources of the Thames River.

Slide No. 8 -- The first increment of channel dredging was accomplished using conventional clam-shell dredge and barge disposal techniques.

Slide No. 9 -- The possible applicability of other techniques for removal and transport of Navy spoil was re-examined. The results were to confirm the superiority of the previously employed techniques for the remaining work.

Slide No. 10 -- A number of alternative disposal techniques were also considered. Most of these, for example, sanitary landfill cover, use as construction material, or marsh building, were found to be not appropriate in the Thames River area.

Slide No. 11 -- However, it did seem possible that disposal on land; that is, behind dikes or waterfront bulkheads, might offer a reasonable

alternative to ocean dumping. Accordingly, this option was examined in some detail. The analysis disclosed that such disposal was not satisfactory because of very high costs and lack of sites with sufficient capacity to accept Navy spoil. This finding forced the analysis back to consideration of ocean disposal for Navy spoil.

Slide No. 12 -- The total dredging requirements for the Thames and vicinity have been examined for the next decade. These were found to amount to about 5.4 million cubic yards, including programmed and unprogrammed Navy dredging. This provided a benchmark for the possible cumulative effects of spoil disposal at a single site.

372

Slide No. 13 -- Going beyond this, a similar estimate was made for the entire coastal area from the Connecticut River to Narragansett Bay. These, including the Thames spoils, came to 15 to 16 million cubic yards over 10 years.

Slide No. 14 -- Very detailed studies were made of 15 ocean sites, including that at New

London which had been used for the first increment of spoil disposal. Analysis revealed that at six of these sites the materials would not be contained at the site, but would be widely dispersed in ocean waters. These were eliminated from further consideration.

Slide No. 15 -- This left nine containment sites. These were rated with respect to retention, capacity, biology, fishery, other human uses, regulatory considerations, and cost. AFter application of weighting factors, which will be explained, a score was derived for each site and the sites then ranked in terms of environmental suitability for use as a dredged material disposal area. In the initial analysis, cost was rated as of rather low importance. To be sure that this did not upset the final conclusions, a sensitivity analysis was accomplished by eliminating cost from consideration completely and by setting cost equal to all other factors.

Slide No. 16 -- This did not change the relative of -- This did change the relative ranking of several sites, but it had no impact

on the major conclusion. The New London site, which happenes to be the least costly, was found to be the most suitable no matter what weight was given to cost in the analysis.

Finally, the possibility of abandoning the entire dredging program was considered. This was found to be unacceptable in that it would preclude the use of the Naval Submarine Base for the basing and support of the SSN-688 class of submarines, with a consequent adverse impact on the National Defense. There would also be adverse secondary impacts on the local economy stemming from this decision. And the imporvement in ecological conditions of the Thames which are expected to follow from the dredging would be lost. 374

Thusa, our studies propose: That the Navy dredging should take place; that the material should be transported by barge to an ocean disposal site; and that the New London site is by a considerable margin the preferred disposal site.

The next speaker, Mr. Steve Davis of Jason M. Cortell and Associates will elaborate

on the environmental considerations utilized in comparing the various ocean disposal sites. Following Mr. Davis, Mr. Robert Reid of the National Marine Fisheries Service will report on t he results of the on-going monitoring studies. Mr. Davis.

(Presentation by Lt. Norris,III was marked Exhibit No. 2.)

PRESENTATION BY
STEVEN C. DAVIS,
PROJECT DIRECTOR,
JASON M. CORTELL & ASSOCIATES, INC.

MR. DAVIS: Good evening, ladies and gentlemen, my name is Steven Davis. I'm the Thames River Supplement EIS Project Coordinator for Jason M. Cortell & Associates. We were consultants to the Navy.

I'm going to explain the process by which we compared disposal sites for the proposed Navy dredging of New London.

The Navy has an immediate need in 1976 and 1977 to dispose of 1.8 million cubic yards of Thames River materials. Over the next decade, other Navy work, Corps projects, and private efforts will raise this requirement to 5.4 million cubic yards for the vicinity.

Slide No. 21 -- In order to find a site for this 5.4 million yard requirement, 15 alternative ocean disposal sites were considered. Six of these sites, containment sites 1,2, and 3, and dispersal sites 1 and 2 located in Block Island Sound, were considered in the original RDEIS as was the Rhode Island Sound site. This was at a time when Long Island Sound was effectively closed to dredged spoil disposal by EPA policy. The Final EIS did consider Long Island Sound, adding New London and added Acid Barge site to the list of candidates. In the expanded considerations that we just completed another six sites in the Sounds were added. These were from Cornfield Shoals off the Connecticut River to Browns Ledge in Rhode Island. The Munitions Site, some 70 nautical miles from the Thames was also considered.

Several years ago, slection from among these would have been simple; the closest was the best. Today, however, environmental factors must also be included, and simple economics no longer dominates the decision.

Consideration must be given to the physical environment, the biological environment and other human uses of a site before spoil disposal can be decided upon.

This evaulation process began with a listing of the characteristics of each site. The characteristics of interest were those which might affect the fate and distribution of the material, those which might provide some insight into the consequences of disposal, and those which might affect the feasibility of using the site.

Slide No. 22 -- This slide shows the data items collected for each of the 15 sites. These include location, by latitude and longitude and distance that bear on regulatory control of a site and on the disposal costs.

The physical characteristics of a site, include the size, the bottom contour, the average depth, and the estimated capacity. These help to determine the suitability of a site to accept the requisite volumes of material.

The current data included tidal velocities,

net velocity and direction and storm-induced velocity. These helped to determine the stability of materials placed on a site.

Sediment data also provided information of the ability of a site to contain materials.

The site use and value lists the human activities of the site which might be compromised by disposal activities.

Regulatory interest in a site had both a negative and a positive aspect. Environmentally, regulation has to be viewed favorably since it helps to insure clean job. Economically, monitoring activities can result in some extra cost.

The biology that we considered included the non-mobile species on the bottom which were likely to be covered by spoils; the opportunistic species which might to recolonize the materials once they were placed; and the mobile species that might be affected either in the short term or the long term. These data provided the basis for a comparison among the 15 sites.

The first point and the most important was the ability of the sites to retain the

Thames River sediments. As was the case when the FEIS was prepared, a site which will contain the sediments is viewed as preferable to one which will disperse them over the wide areas.

Separation between containment and dispersal sites was made by considering prevailing sediment characteristics, bottom currents and monitoring data.

The dominant bottom material throughout the study area is sand, but there are local areas of finer materials such as the silts from Thames River. These materials are most often found where currents do not favor transport. One measure of this characteristic that came up in the Supplement was skewness which is a measure of the grain size distribution of materials.

Slide No. 23 -- The upper curve, along here, represents material which is comparatively rich in fine materials. There's a long tail of materials in the fine direction. It is called positively skewed and might represent an environment in which deposition of fine

materials was occurring. The middle curve's skewness is about zero, representing usually a stabile environment, and the lower curve with proportionally more coarse material might represent an erosive environment.

Storm waves can also help to determine the stability of material.

Slide No. 24 -- The largest waves recorded in either part of the study area are from 26 to 32 feet high and produce velocities up in this range of several feet per second. Ninety percent of the time, however, waves are less than 8 feet in the eastern portion study area and less than 6 feet in the western portion, producing the smaller velocities shown by the light curves at the bottom. These were the waves which were of interest in determining the possibility of spoil movement by normal wave action.

350

Slide No. 25 -- Based on this type of analyses, four sites emerged as clearly in the containment category; these were New London; Browns Ledge and containment sites 1 and 2. Five other sites offered at least a marginal

ability to contain the silty sediments from the Thames River. These were the Rhode Island Sound site, Acid Barge, Munitions, East Hole and Niantic. These also were found in all three sounds. The available evidence suggest that the remaining six sites, containment 3, West Hole, dispersal 1 and 2, Orient Point and Cornfield Shoals will not contain Thames River sediments. They were, therefore, dropped from the consideration.

This, however, didn't provide a clear reason for selecting one of the remaining sites over another one. A ranking of the sites was required.

Slide No. 25A -- The ranking, in terms of retention, was accomplished by consolidating the many data items. The frist which was used was retention, which has been used to cull the number of sites. Ranking were assigned on a scale of 1 to 4 with one representing an excellent site for disposal, and four representing a poor site. In terms of retention, the preferred ranking was assigned to New London where active monitoring has revealed that spoils

are stabile and not leaving the site. Second rank was assigned to containment site 1, containment site 2 and Browns Ledge, all of which appeared to offer a good chance for retaining Thames sediments.

Of the five marginal sites, East Hole, Munitions and Acid Barge all offered a fair possibility of containing sediments and were ranked third. The Rhode Island Sound site was ranked fourth because of evidence suggesting that some fine material deposited there in the past was leaving the site. For similar reasons Niantic was also ranked fourth.

The sites were next compared in terms of their capacity to accept materials without either creating a navigational hazard or filling close enough to the surface so that normal wave action would move the material about.

382

Slide No. 25B -- The sites were ranked order from largest to smallest capacity and broken into four groups. First ranked were the very deep sites, Munitions and Acid Barge. Somewhat shallower sites, Niantic and East Hole

ranked second; Containment site 2, Browns Ledge and New London ranked third. Four ranked was assigned to the Rhode Island Sound site and containment site 1 which were the shallowest sites.

The site ranking for biology was a combination of benthic fauna, bottom dwelling animals and fish in order of increasing diversity and contribution.

Slide No. 25C -- Rated in this fashion, the New London site must be considered as the most suitable for disposal. It is in the early stages of recolonization following the latest disposal episode.

The second ranked position was assigned to East Hole, the Rhode Island Sound site, containment site 1 and Munitions. The Niantic site, with high benthic diversity and moderate fish populations, was assigned the third rank meaning not very suitable for spoil disposal. The fourth rank,representing areas both susceptible to impact and rich in resources, was assigned to containment site 2, Browns Ledge and the Acid Barge site.

One aspect of this biological environment was singled out for separate treatment; the fish and shellfish supporting commercial and sport fisheries.

Slide No. 26 -- The long list of shellfish found in the study area as can be seen on the slide, shellfish are harvested throughout the study area. The ocean quahog is the most extensively harvested and is taken throughtout Block Island Sound and western Rhode Island Sound. It is in that area that the harvesting is most heavy.

Slide No. 27 -- Conversations with fishermen along the coast showed that much of the study area is moderatley trawled for fish. The National Marine Fisheries Service annual hail statistics for the area indicated a value of well in excess of $8 million per year.

Slide No. 28 -- Lobster fishing occurs in shallow waters throughout the study area. This has a probable value in excess of $3 million in the three Sounds. Crabs are also taken along with or instead of the lobsters but don't provide nearly the income of the lobster fishery.

AD-A031 434 NAVAL FACILITIES ENGINEERING COMMAND PHILADELPHIA PA --ETC F/G 13/2
FINAL ENVIRONMENTAL IMPACT STATEMENT, DREDGE RIVER CHANNEL: NAV--ETC(
SEP 76

UNCLASSIFIED NL

5 OF 6
AD
A031434

Taken together, the fin and shellfish resources of the study area are valuable economically as well as an environmental consideration.

Slie 28A -- The ranking in these terms was in order from lowest to highest reported fishing effort and yield. The Munitions site and New London were ranked first since both have low reported fishing yields. Containment site 1 and East Hole were assigned the second rank. Both support somewhat more fishing than the first ranked sites. The third rank was given to the Rhode Island Sound site and Niantic. Both support fairly intensive trawling, lobstering, shellfish harvesting and sport fishing.

The highest ranked sites, and hence the least favored for disposal, are Browns Ledge, containment site 2, and the Acid Barge. All three yield large catches of fish and shellfish.

Each site was also ranked for site use other than fishing. The more possible conflicting human uses of a site, the higher a site is ranked.

Slide No. 29 -- Military uses were

virtually all submarine related, and included an anchorage area off Gardiners Island, a practice minifield and acoustic range off Fishers Island, and a torpedo range which is obvious in Rhode Island Sound.

Slide No. 30 -- Research activities are concentrated in Block Island Sound and include New York Ocean Science Lab transects, A Naval Underswater Systems Center Acoustic range, Uconn and NOAA studies at East Hole, Yale and University of Rhode Island lobster studies and a nuclear plant study off Charlestown, Rhode Island.

Slide No. 31 -- There are also some submerged cables in the area primarily about Block Island and Fishers Island.

Slide No. 31A -- In terms of these other uses, New London, with no reported use other than dredged material disposal, ranked first. Rhode Island Sound site and Niantic were ranked second. The Munitions Site, Acid Barge and Browns Ledge have no conflicting uses, but did support fisheries. They were ranked third. East Hole and containment site 2, both

386

in the Block Island, Fishers Island Acoustic Range, were ranked fourth.

Slide No. 32 -- In terms of regulation, the stronger the interest in a site, and the more intensively it has been scrutinized, the less likely there are to be unanticipated environmental consequences.

As can be seen on t he slide, all of the study area falls under the jurisdiction of one or more regulatory agencies. In the navigable waters inside the territorial sea baseline, the heavy black line, the EPA and the Corps both have regulations for disposal in navigable waters. Beyond the baseline,the Ocean Waters Rules apply. The jurisdictional aspect also includes state interest out to the three mile limit from the baseline.

Slide No. 32A -- Rated in these terms, New London and Rhode Island Sound sites both actively used and monitored are the first choices.

The second rank is assigned to Browns Ledge which is positioned on the borders claimed by Massachusetts and Rhode Island.

The Niantic site, in Connecticut waters, and containment site 1 in New York waters, would both require less coordination and review than the first three and are ranked third.

The fourth rank was assigned to the remaining four sites, Acid Barge, Munitions, containment site 2, and East Hole, none of which lie in the waters of any state.

Slide No. 33 -- The last element considered was that of cost. This is related basically to travel distance from the mouth of the Thames. Secondary cost elements are the existence of monitoring data and the location of the site with respect to the boundary of the inland rules of the road. Previously monitored sites are somewhat less expensive than others, and deep ocean sites which require heavier scows are somewhat more expensive than more sheltered sites.

Slide No. 33A -- Cost is the most direct ranking. New London and Niantic are the closest so they are the least costly. Both are very close and, one, New London has had intensive monitoring.

3FP

Containment sites 1 and 2 and the East Hole are within inland waters fairly close to New London and have been assigned the second rank in terms of cost.

The third ranking was assigned to Rhode Island Sound site, Browns Ledge, and the Acid Barge site. In all three cases, the haul distance was the primary factor raising costs.

The most costly site, and fourth ranked, is Munitions. It's not only the most distant, but would be the most difficult and expensive to monitor.

Slide No. 34 -- Finally, back to the confusing chart we saw earlier -- The final step was to convert the individual ratings assigned to each site into a composite rating. It was felt that not all parameters were of equal importance, so weights were assigned. Those appear along the top, both as percentages and as a multiplier. Retention was weighted the highest at 30 percent. Biology was rated second highest at 20 percent. These were followed by fishing and other uses which were

con-idered of equal importance and weighted at . percent. Regulatory considerations were weig :ed at 10 percent; and finally, capacity and cost were rated at 5 percent each. These were employed as multipliers for the individual ratings that I just went over. The ratings for each site were summed and the sites then rank ordered in terms of number.

The results, which were strongly skewed in favor of environmental values, showed the New London site to be greatly preferable to any of the alternatives. That is the second column here. The first column is for comparison and is the unweighted scores without the weighting.

Finally, because cost, which has played such a commanding role in past decisions had been given so little weight in this one. An dditional analysis of sensitivity was performed by varying the cost element. The first cost was eliminated completely, and second, it was set equal to all other factors.

Only two of the sites, Niantic and Munitions, showed large change in acceptability depending on the emphasis given cost. Cost

350

aside, the Munitions site is very acceptable and Niantic is very unacceptable. With cost set equal to all other factors, the Niantic site is very acceptable because of its proximity to New London, and Munitions is the least acceptable. The proposed site at New London remained at the head of the list in all cases and was selected as the most desirable site for ocean disposal of Thames River material.

The proposed disposal site is an area one nautical mile square, 2 and 1/2 miles south of the mouth of the Thames. It consists of a natural depression averaging 70 feet in depth, save for a broad mount in the southwest corner where previous disposal has reduced the depth to about 58 feet.

The bottom sediments reflect past activity most recently from the first increment dredging.

Slide No. 36 -- To date, 1.5 million cubic yards of materials have been disposed of at the New London Dumping Ground during the first increment. On August 5, 1975, this bottom

profile was runned by the U.S. Coast Guard. The distance between the vertical lines is 20 feet.

The bottom profiles as determined by this survey accounted for 95 percent of the material deposited at the site and indicated that minimal erosion was occurring.

The survey also showed that the depression of the site will be sufficient to accept the material generated pending Navy and non-Navy projects without affecting navigational approaches to New London. If the entire 5.4 million cubic yards from the next decade were deposited uniformly over the dumping ground the average decrease in depth would be on the order of four feet. There might be local mounds with depths up to 20 feet as is the case in the first increment disposal shown here. But localized settling and spreading of the material will tend to reduce these surficial irregularities with time.

Detailed studies of the characteristics of the sediments indicate that the local bottom currents aren't moving about. Consideration of

352

storm waves suggests that the site may be filled to a depth of 40 feet below mean low water, yielding a theoretical capacity of 41 million cubic yards as compared to the 5.4 million cubic yard requirement.

The biological monitoring programs carried out under Navy auspices indicate that benthic fauna in the disposal area differ from those in other portions of the site. However, there is evidence of active recolonization of benthic fauna. While a number of fish species are found in the general rea, commercial fishermen still avoid the site. There is some sport fishery, but not so extensive as in nearby areas such as the Race. Lobsters are known to be inhabiting the dredged material, but there is no data as yet available for catch for the site. The harvesting of available stocks of oysters and quahogs was restricted because of pollution even before disposal began.

Dredging and disposal operations are expected to cause a minimal impact on the local commercial and sport fisheries. Preliminary

findings suggest that the initial impacts are temporary. Evidence of biological recovery has been reported in the river and at the disposal site. In the long term, both fisheries are expected to benefit.

Part of the support for this expectation, and much of the data concerning the New London site is taken from the Navy Increment One Monitoring effort. Bob Reid, from the Middle Atlantic Coastal Fisheries Center will speak about that effort and its results. Bob.

(Presentation by Steven C. Davis was marked as Exhibit No. 3.)

PRESENTATION BY
ROBERT N. REID,
CHIEF, COASTAL ECOSYSTEMS INVESTIGATIONS

MR. REID: Thank you.

We've been studying the sediments and the bottom invertebrates of the river and the disposal area. Our Milford, Connecticut, laboratory is conducting microbiological analyses of water, sediments and selected organisms from the same areas. Other portions of the overall survey are being done under subcontract: The New York OceanScience Laboratory is involved

394

with the physical and chemical oceanography of the disposal area, and the University of Connecticut is doing similar work in the river. I'll attempt to summarize pertinent results only of the physical and chemical studies and some findings of the microbiological surveys, but first I'd like to concentrate on the information we've obtained from our bottom invertebrate sampling.

We feel it is important to monitor a biological impact of dredging and disposal as well as physical and chemical effects. In some cases the organisms are very sensitive to contaminants, and are affected before these contaminants can be detected chemically. Biological monitoring may give the added advantage of being able to integrate pulses of contaminants over the long term, whereas a chemical sampling program could miss these pulses.

Finally, whether or not changes in bottom invertebrate populations are seen, it is important to know whether contaminants are being accumulated by the organisms and perhaps passed up the food web.

We consider the bottom invertebrates to be the best available biological tool for determining the effects of impacts such as dredging and disposal. Many of these species are relatively immobile, and so are more vulnerable to point-source impacts than fish or even plankton organisms are.

Also, a number of the bottom invertebrates in the New London area have relatively short generation times, with two or more generations per year, so if impacts are sublethal, limited to a reduction in growth, reproduction, or the like, we'll be able to detect the impacts more quickly and easily by monitoring these organisms. 396

Before a discussion of our reults though, I'd like to show a few slides which were taken by the University of Connecticut divers and which illustrate the bottom environment of the disposal area before the first increment of disposal took place, and then the nature of the first dredged material.

Slide No. 1 -- This slide shows the prevalent type of predisposal invertebrate community in the New London area. The large organism is a

sponge; but the smaller features these are amphipods tubes, tubes made by small crustaceans. Populations of these amphipods have been found almost wherever we found silty sand sediments int he disposal region.

Slide No. 2 -- These are three of the dominant or most abundant amphipod species in the area. They are small. They reach a maximum of perhaps an inch in length, but they can establish quite dense populations. We've found over a thousand in some of our samples and our samples consist of a tenth of a square meter of sediment surface. The overall dominant species at New London is Ampelisca vadorum on the bottom (indicating). We've shown that Ampelisca, also Leptocheirus pinguis, which is a top species, to be important in the diets of New London area fish.

Other studies have indicated that amphipods can be very sensitive indicators of environmenta contamination. Ampelisca, for instance, may be affected by oil before the oil can be detected by the most sensitive chemical analyses that are presently in use.

Slide No. 3 -- Silty sand is the major natural sediment type in the immediate disposal area, but other types are also in evidence. Here the silty sand with the amphipod and worm tubes merges very abruptly with a pure sand habitat which contain a distinct community of organisms. The New London area is characterized by these sudden habitat changes over short distances. This heterogeneity or patchiness of the environmental can increase the variability of our samples.

Slide No. 4 -- The area also contains limited quanitities of rock, gravel and other hard substrates, such as this (indicating), and these areas typically support yet another distinct group of animals including attached forms such as ectoprocts. These are superficially like tiny corals, also hydroids and anemones 398

Slide No. 5 -- The disposal area did contain modest populations of lobsters which supported a moderate fishery before the onset of Phase I disposal.

Slide No. 6 -- The majority of the materials dumped during Phase 1 appear to be fairly

cohesive clays, which were often deposited in large clumps such as this (indicating) rather than spreading uniformly over the bottom. The surface of the pile has areas of sand interspersed with the clays. These could represent either lag deposits, which are residues of coarse materials, which are left as the finer sediments are eroded or they could also represent individual barge loads containing different material. The cohesiveness of most of the dumped materials is shown by the fact that these clumps often crack open rather than settling and spreading evenly - Slide No. 7

Slide No. 8 -- The spoils do contain a few organisms, such as this quahog and also smaller bivalve clams called Nucula proxima, which are native to the river.

Slide No. 9 -- To monitor the effects of disposal on the area's sediments and microbiology as well as the bottom invertebrates, our lab has been sampling some or all of the stations of this basic pattern which radiates out from the disposal buoy -- Station C6 here, the larger dot.

We have sampling stations at 1/4, 1/2 nad 1 mile distances from the disposal buoy. These one mile stations are the critical sites as far as most of the monitoring criteria are concerned. Detection of certain impacts at these stations would dictate either a change in the methods of dredging and disposal or complete haulting of dumping at New London.

We also sample reference of control stations which are located 1-1/2 and 2 miles from the disposal buoy.

Our sampling has been on a quarterly basis beginning with a predisposal survey in June and July of 1974 and extending through at least October '75. We also resampled selected stations in February 1976 and collected organisms for analysis of heavy metal uptake as recently as May '76.

Slide No. 10 -- This slide shows percentage changes in numbers of species or varieties of bottom invertebrates between the June 1974 predisposal sampling and June '75 which is after 10 months of dredging and disposal. The levels for the various symbols that we've

used are based on variability of the predisposa samples, so a change of less than 17 percent here -- this is statistically small. It's within one standard deviation of the average of all predisposal samples that we've analyzed. Changes greater than 50 percent here is more than two standard deviations away from the June 1974 values, so this is a large change and probably meaningful. The open circles represent an increase in numbes of organisms; the closed circules are decrease; and the half-open symbols are representing the small either increase or decrease which is within one standard deviation of the average of the pre-disposal samples. So this slide shows there has been a substantial overall decrease in numbers of species at these 14 stations between June of 1974 and June of '75, more black dots than open circles.

The average number of species actually decreased from 41 to 34 per 10th of a square meter of bottom area and this could be taken as an indication of disposal impacts. However, several published studies have shown long-term

fluctuations of this magnitude to occur naturally in the absence of any apparent impacts. We interpret the decrease at New London to be a more natural phenomenon than an affect of dredging and disposal for the following reasons: Some of the largest decreases are found at the control stations, two miles from the disposal buoy; whereas the five stations at 1 mile radii from the disposal buoy actually had a net increase of two species per sample. If the decreases were a spoiling effect, one would expect the stations closer to the disposal buoy to show larger changes than the control stations further away do.

We've done the same analysis with numbers of individual animals. We've found a similar pattern, but the published studies that I mentioned have reported that numbers of species which we show here is a more conservative parameter than numbers of individuals. The long-term fluctuations are generally on a smaller scale. Changes in species numbers should be more meaningful and a better indication of impacts of dredging and disposal than with

the changes in numbers of individuals, but the same pattern for both individuals and species -- Slide No. 11.

The only change in species numbers that was found to be significant at the 95 percent confidence level was at the disposal buoy. We feel that this is an accurate reflection of disposal impacts to date. They have been detectable and separable from natural fluctuations only where the invertebrate communities have actually been buried by the dredged materials.

We've also made limited comparisons between October 1974 samples, which is after one month of dredging and disposal; and October 1975 collections. As with the comparative June data, the October analyses showed no systematic changes, or gradients of change relative to distance or direction from the disposal buoy that might be indicative of disposal impacts. We found a significant decrease in individuals at a control station two miles west-northwest of the buoy. There is a significant decrease here but also a significant increase at another

station a short distance fo the south of this. There were no significant changes at stations 1/2 and 1 mile west-northwest and also 1 mile east of the buoy. These stations are in directions which should show fairly early and large effects of any disposal impacts based on the current information that we have to date.

Slide No. 12 -- The October 1975 samples also give us an idea of the amount and rate of the recolonization of the dumped materials. This slide shows numbers of individuals and species, and species diversity, at the disposal buoy. Our predisposal sampling was June and July 1974. The next sampling was after a month of spoiling, October '74 and so on.

The predisposal samples contain the typical amphiphod community that I showed before. Numbers of individuals were approximately 500 per sample -- this broken line (indicating), which is about average for the New London area. Numbers of species and species diversity were slightly above average.

In October of '74 the sample consisted of

spoils with very few organisms. All parameters dropped. There was little change from this condition in the January or April 1975 samples. Not much rise; a slight rise in numbers of individuals. Some increases were seen in June of '75 and by October of 1975 numbers of individuals, species and species diversity were all significantly, according to the 95 percent confidence limits which are indicated here, all significantly above those which had been found for the preceeding October through April samples, although they were significantly below the predisposal values.

It is important to note that the recolonizing fauna was again dominated by amphipods that I discussed earlier. These are the characterizing species of what is probably a climax or equilibrium community found in silty sands throughout southern New England. Their presence indicates that they can tolerate the dumped materials and that the fauna of the disposal area can eventually be expected to return to a near-natural community, at least in terms of numbers of species. This has been found in a

study of a somewhat similar disposal and recolonization sequence at Brenton Reef in Rhode Island Sound. The tubes of these amphiphods can act to stabilize sediments, so they may aid in limiting erosion of the spoil pile.

The amphipods are important not only within the invertebrate community, but also in the diets of several local fish species, as I mentioned earlier.

Slide No. 13 -- This is a winter flounder over the amphipod tube community. Our laboratory has been doing stomach content work whic ıdicates that winter flounder as well as scup or porgy both at New London and in the East Hole area feed almost exclusively on these amphipod species. So it is significant thatthe amphipods can recolonize the spoils fairly quickly, and that amphipod communities near the disposal area -- we've consistently found them at two stations located a mile to the east and to the north-northeast of the disposal buoy. They were present on the February 1976 survey. It appears to be that amphipods

401

don't appear to have been impacted by this disposal. This leads us to presume that the overall productivity of the New London area has not been much affected to date.

Related to this, University of Connecticut divers had predicted that lobstering might actually improve once the spoil habitat was completely settled. They had counted an average of six lobsters per dive transect on a predisposal survey, and expected to eventually see 25 to 30 per transect. This may be because the spoils provide topographical relief and/or a suitable burrowing substrate.

Our Milford laboratory has recently released data indicating that these disposal area lobsters have experienced no changes in concentrations of tissue heavy metals between June of '74, the predisposal samples, and June 1975 collections. Also that heavy metals have been lower in the New London lobsters than in lobsters from the New Haven dumpsite.

Milford has also been studying microbiological effects of the dredging and disposal. Their predisposal sampling revealed that densities

of fecal coliform bacteria, which are an indicator of human waste contamination, were much higher in sediments from the river then in either the disposal or control area sediments; but that both disposal and control area stations had concentrations which were somewhat above background levels before Phase I disposal took place.

Fecal coliforms in bottom waters over the disposal grounds were more abundant on an ebbing than on a flooding tide. This implies that the influence of river contamination can be felt in the disposal area. Milford's, 408 during and post-disposal sampling, has not shown any increase in bacterial levels in river or disposal area. There was, in fact, a large decrease in fecal coliform concentrations of surface sediments of river, dumpsite and control areas between July of '74 and July of '75.

At the disposal area, the New York Ocean Science Lab has placed drogues which are parachute type drifters in the column to follow the plumes of individual bargeloads of dredged

material. Water sampling around these drogues has shown that turbidity, suspended and volatile solids have increased, and dissolved oxygen decreased, after a disposal event; but that values have returned to ambient or background levels within anywhere from 10 minutes to two hours after a dump.

When transects of stations are passing through the disposal point have been monitored in the absence of any barges unloading values of pH, Eh, dissolved oxygen, suspended and volatile solids have shown no relation to distance from the spoil pile. On two occasions turbidity was found to be slightly greater downstream of the spoil pile than upstream.

Havy metals, phosphorus and nitrogen in seston, and seston includes all particulate matter in the water column, have had no significant trends within the area monitored. Sediment heavy metals, phosphorus, nitrogen and chemical oxygen demand have been somewhat higher in and near the spoil than further from the disposal point.

It is concluded that no major changes

attributable to dumping have yet been detected in the sediments or water column. Analysis of metals in organisms is still continuing and this includes the samples that we took in May of '76.

The studies, by the University of Connecticut, in the Thames River have indicated the following: metals in oysters, quahogs and a smaller clam, pitar, have shown variations overtime and between species which are probably natural and independent of dredging. Gross pathological examinations of these shellfish have revealed no detectable abnormalities. Surveys made near the operating dredge and barge demonstrated that turbidity plumes were consistently confined to within 150 meters of the dredging operation. The limited size of the plumes prevented them from having a significant impact on overall turbidity in the lower river where storms were found to have larger effects on turbidity than the dredging did. Colonel Garver.

(Presentation by Robert Reid was marked as Exhibit No. 4.)

COLONEL GARVER: Thank you very much.

415

We are now ready for comments from the floor and in accordance with our usual protocol we'll take those comments first. Is there a member of Congress present who wishes to be heard?

(No response.)

Is there anyone representing a member of Congress?

PRESENTATION BY
AARON B. DONNER,
AIDE TO CONGRESSMAN OTIS PIKE

MR. DONNER: Colonel, my name is Aaron Donner. I'm here as a representative of Otis Pike. Congressman Pike's Washington schedule prevented him from being here tonight. However, I have an advantage now. I was here in September of 1973, and I was prepared for that meeting and I did a certain amount of work. I will say, frankly, more than this meeting. In preparation for that meeting, we came across a letter that was from the Environmental Protection Agency and the letter was dated May 8, 1972. I'm excerpting a portion of the letter because that's what I have before me. "The spoil material violates

the Environmental Protection Agency criteria for ocean disposal. The weighted average force of the material to be dredged violates the criteria established for volatile solids, chemical oxygen of man, and total calgon nitrogen.

We recommend that material be disposed of outside of Long Island Sound."

We also read an earlier report from the Navy which preceeded that that they like Rhode Island Sound, and that they thought that was the ideal place to dump the stuff in the Thames River. However, probably somebody from Rhode Island complained about it being dumped in Rhode Island Sound and we ended up back here.

I am not in any position to comment on the technical statements of these gentlemen. The only thing I am in the position to comment on is that I've listened to a lot of hearings, and I will comment that this had the aspect of a self-fulfilling prophecy. I watch the charts carefully. I try to follow the waiting procedure as carefully as I could, but somehow

or other, and I guess I'm just cynical, I knew that the New London site was going to win every single time. I just knew it was going to come out first. As a matter of fact, we discussed the reason. One other point I want to relate -- and maybe I did not understand it -- is the reason that we're here tonight is not that it was so much fun in September of 1973; the reason we're here tonight is because a Federal District Court rendered an injunction against the further dumping and ordered supplementary findings and investigations by the agencies involved before any dumping could continue.

Now, I will say this that I do not know. As I say, I hope there are technical people available. I hope there is technical knowledge. I am not in a position to dispute. However, on behalf of the Congressmen from the First Congressional District of New York and Fishers Island being part of Suffolk County in the First Congressional District, we still feel that dumping -- is it 2.8 million yards -- of fill within several miles of Fishers Island

in the Sound where again by experience seems to be an area of some environmental sensitivity.

We would request, if that is the purpose of the hearing, if I heard your notice correctly, Colonel, that the permit be revoked and at least once again some further examination be given to this problem. Thank you.

COLONEL GARVER: Thank you very much, sir.

Are there any other members or anyone representing other members of Congress present?

(No response.)

Is Governor Carey or his representative present?

PRESENTATION BY
JOHN SHAY
ASSISTANT ATTORNEY GENERAL,
STATE OF NEW YORK

MR. SHAY: Good evening, Colonel. My name is John Shay. I am an Assistant Attorney General, State of New York. The State will be represented tonight by the Attorney General's Office and the State Department of Environmental Conservation.

The Department of Environmental Conservation will cover all the scientific issues for the

419

State concerning the Navy's project. There is only one legal point which I will address on behalf of the Attorney General. Further comments on the legality of the proposed action, and the legality of procedures followed by the Federal Government in this instance under the National Environmental Policy Act, will be submitted within the next 10 days during which, I understand, these proceedings are still open for comments.

COLONEL GARVER: That's correct.

MR. SHAY: One of the factors stated to be of foremost importance to the Federal Agencies involved in reaching a decision on the project is the long-term retention capability of the ultimate disposal site. It's significant that as to the first phase of the dumping the draft supplement states that 95 percent of the spoils dumped at New London have stayed there, but there has been a movement of approximately 5 percent of those spoils.

While the Navy quite properly has issued in Volume 3 of the Draft Supplement quarterly reports of the ongoing environmental survey of

dredging and disposal impacts at New London, it has always been acknowledged in the scientific community that these would be of somewhat limited value, and that it might be some time before the actual movement of spoils could be detected.

NEPA requires full disclosure of all the known facts concerning a proposed federal action. This principle has been reiterated very forcefully in a number of federal appeals decisions rejecting certain Environmental Impact Statements and the proceedings thereon.

So to in this case NEPA requires a full disclosure of all the relevant data in the possession of the responsible Federal Agencies. The failure of the responsible Federal Agencies in this case to issue the 5th,6th,7th and seventh quarterly reports of the environmental survey of the dredging and disposal impacts may very well constitute a violation of the strictly construed and enforced NEPA mandate to fully disclose all relevant data.

The very last of these reports was due last month. The sixth was due in February.

417

These reports are suppose to assess the movement of spoils at New London during the turbulent winter months. Apparently in February of this year the area experienced some storm activity that might well have affected the retention of the spoils in the area.

It is impossible for the public and for the state scientific staff to meaningfully comment on the Draft Supplement if they are not fully informed of the most recent monitoring data which admittedly made be more indicative of the future impacts of this spoil disposal than that data previously acquired.

Thank you.

COLONEL GARVER: Thank you very much, sir.

Are there other representatives of Governor Carey present?

MR. SHAY: I believe the Deputy Commissioner of the Department is suppose to be here Mr. Middleton.

COLONEL GARVER: Mr. Middleton.

PRESENTATION BY
DON MIDDLETON,
LONG ISLAND REGIONAL DIRECTOR,
STATE DEPARTMENT,
ENVIRONMENTAL CONSERVATION

MR. MIDDLETON: Colonel, ladies and gentlemen, my name is Don Middleton and I serve as Long Island Regional Director for the State Department of Environmental Conservation. I'm here this evening representing the Commissioner Peter A. Barle who has asked me to present this brief statement.

This statement constitutes the preliminary comments of Commissioner Barle of the New York State Department of Environmental Conservation on the Draft Supplement to Final Environmental Impact Statement, here and after referred to as the report, on the dredge river channel,Naval Submarine Base, Groton, Connecticut.

Final detailed comments and findings will be submitted within 10 days. In general, the report presents a much more comprehensive environmental data base for decision making than its predecessors. This data base suffers only one major shortcoming. The 5th, 6th and 7th quarterly reports of the monitoring program, due November '75, February '76 and May '76 respectively,'and all reports on the baselines

418

studies of East Hole should have been included in Volume 3. This Department believes that long-term planning for dredged material management must include full and detailed consideration of alternatives to aquatic disposal. In this regard, we find that the report dismisses the possibility of the construction of container islands in too "offhand" a fashion. Moreover, in dismissing the use of land base disposal sites, the report forecloses one extremely important disposal option. Although the identified sites lack the holding capacity for all of the Navy's dredged materials, certain of the sites could be used for disposal of only the most highly contaminated sediments such as those from various areas and upper strata.

Such disposal efforts, however, must not damage tidal wetlands and must be so designed as to prevent significant contamination of Thames River's waters from spoil area runoff.

While we find much of the narrative descriptions of ocean disposal sites to be complete and accurate, we find that the matrix

analysis used to compare the sites is often bias, non-objective and incomplete.

The Navy's conclusion that New London is the best containment site is evidentally based on a comparison of monitoring observations at New London with physical data from other sites. Clearly this is comparing apples and oranges. When one compares bottom sediment, grain size, tidal currents, and wave induced currents, the New London site is clearly inferior to East Hole and containment sites 1 and 2. Moreover, there is limited evidence to date that the spoil site at New London is spreading to the northwest and southeast. The 6th and 7th quarterly monitoring reports, including winter and spring data for 1975, may establish whether such spreading is occurring.

420

Biological factors in dump site selection have not considered a very significant issue. Since estuarine productivity is generally much higher than that of offshore areas, and since human use and consumption of estuarine harvested resources is similarly higher near shore sites such as New London and containment

site 1, should be regarded as more susceptible to long-term impacts of exposure to toxic components of dredged spoil than the offshore sites such as East Hole.

In summary, the report provides inadequate treatment of construction of containment islands and a combination of land and ocean disposal. The matrix analysis of ocean disposal sites requires revision so that subjectivity is removed and additional biological factors are considered. If such subjectivity cannot eliminated, the matrix should be deleted. Detailed comments on these and other matters pertaining to the project will be submitted within the next 10 days. Thank you.

COLONEL GARVER: Thank you, sir.

Are there any other representatives of the Governor present?

(No response.)

Is there a member of the State Legislature who wishes to be heard?

(No response.)

Are there any elected county or municipal officials who wish to be heard?

PRESENTATION BY ALBERT M. MARTOCCHIA, SUPERVISOR, TOWN OF SOUTHOLD

MR. MARTOCCHIA: Supervisor, Town of Southold, Al Martocchia. Colonel, my concern, unknowing to a lot of people, this project is going to involve a lot disturbance to an island that happens to belong to us; namely, Fishers Island. The concern over there is tremendous. They do not have any tools to fight with. I'm sure they will be represented tomorrow night at the hearings in Connecticut. However, I have the highest respect for the Navy's wishes in wanting to open up the river to be able to accommodate their new sophisticated vessels, 100 percent in favor.

However, I have some reservations and I respect most of the study reports I've heard tonight. I'm not a person that convinces too easy. I've been involved with government some 20-plus years, and I've been involved in a lot of studies and a lot of hearings. In all those years what comes back to me -- I've called for a lot of studies -- and in those studies regular my thinking has surfaced. My wife

422

tells me that I'm not that smart and I agree with her. I don't give everything to the studies. I take it, have a factor to divide with and so on like that. I try to take the meat out of it. I Know there is a project that has to be accomplished and rightfully so. I would suggest that further study be given for other alternatives; and that the permit at this time, as it is temporarily suspended, stay that way. I wouldn't say revoke. I wouldn't go that far, but I would like to see further studies and other areas explored.

I have a statement from our Town Board in reference to the project of dredging the Thames River. "The Town of Southold wishes to reaffirm their opposition to the placing of spoil from this project in Long Island Sound particularly in the Fishers Island Area.

The Town feels that a land disposal site or offshore dumping area would be a better alternative, and more in keeping with the best interest of the public. Town of Southold, signed Albert M. Martocchia and Councilman Jim Homan." Thank you.

(Letter from the Town of Southold was marked as Exhibit No. 5.)

COLONEL GARVER: Thank you very much, sir.

Are there other elected county or municipal officials who wish to be heard?

(No response.)

Are there any officials of any federal agencies who wish to be heard?

(No response.)

Are there any officials of a city or town agency who wish to be heard?

(No response.)

This finishes the protocol and we'll begin on the cards in the order in which I received them. James Homan.

MR. HOMAN: Colonel, I'm here tonight on behalf of the Long Island Fisherman's Association, and its Executive Secretary. I had expected to be here on another behalf also, but thanks to Supervisor Martocchia that's been taken care of.

On behalf of the Long Island Fisherman's Association I've sat here this evening and heard a great deal of information, but I haven't

heard any where they have shown an improvement in the dumping area as far as the fishermen are concerned; mainly, the marine life in the area. The Long Island Fishermen are -- of course it is on record from previous hearings -- against disposal of spoil in both Long Island Sound and Block Island Sound. And while we do not oppose the dredging of the river itself, we do realize that this is a Connecticut river; this is Connecticut spoil; this is, in fact, a Connecticut problem, and we do wish that Connecticut would settle their problems without imposing on their neighbors. Thank you.

COLONEL GARVER: Thank you, sir.

Jean Tiedke.

MS. TIEDKE: Could I defer, Colonel?

COLONEL GARVER: Surely.

Shirley Bachrach.

MS. BACHRACH: I represent the League of Women Voters of Riverhead-Southold. The League of Women Voters of Riverhead-Southold has reviewed the supplement to the Environmental Impact Statement submitted by the Department of the Navy dated April 1976. We continue to

oppose the use of Long Island Sound as the ultimate sump. We dispute a number of assumptions which appear in this Supplement and will discuss some of these.

One - on page 68 the heading of paragraph 3.57 refers to the New London site as "A proposed ocean disposal site." Yet, on page 307, paragraph 6.408 refers to the New London site as an inland water. The Random House Dictionary defines Long Island Sound as a relatively narrow passage of water between the mainland and an island. The characteristics of Long Island Sound are not the same as those of the ocean. Therefore, the use of these two designations used interchangeably weaken the scientific credibility of the study.

Two - the use of the phrase, "Historic dumping grounds" with reference to the New London site, assumes that once an area is used for dumping, which in this case 1943 is the earliest date, its indefinite use for this purpose is acceptable. Figure 6-18 charts a proposed 10-year accumulation of nearly 16 million cubic yards in the area from the

Connecticut River to Narragansett Bay just in the 10 years from 1975 to 1985. Historically, most of the dumping at the New London site was from 1972 through 1975 which amounted to 2 million plus cubic yards. Now it is proposed to dump 4.9 million cubic yards by 1980. What will be the interaction or synergistic effect between, for example, any of the heavy metals and chemicals or cobalt-60 from the Submarine Base, the latter having a half-life of 5.2. years. What will be the cumulative effect of these plus the radionuclides emitted from Millstone Nuclear Power Plants 1 and 2 plus Shoreham and Jamesport if they go into operation?

Barbara Ward, the noted British economist and author writes, "Inland seas can lose much of their dissolved oxygen if excessive waste disposal stimulates the growth and then the death of oxygen-absorbing algae. One of the profound problems posed by nature's "thresholds" is that the approach to the point of no return may give few if any danger signals. Red lights do not flash on in the deeps as one more species

of whose role in the total ecosystem we are completely ignorant heads for death. We do not even know what we are losing. Even if we did, it would be too late."

Three -- Paragraph A-17 states "It is anticipated that pollutants, including creosote, resulting from pier removal and possible blasting will be sufficiently diluted by the river action." We consider pollution by dilution unacceptable whether the pollutants enter the air or the water, just as use of air or water as a heat sink is unacceptable.

Four -- Figure 6-8, opposite page 194 depicts shellfish beds and refers to Bay Ocean Quahogs and Bay Sea scallops, again a strange dichotomy of designation for crustaceans of inland waters.

Five -- Page 17 of the Fourth Quarterly report, dated August 1975. The paragraph concludes, "results of the recent survey will be presented in a forecoming annual report which will be submitted in lieu of this quarter's report." Does this mean that further studies are still to be carried out?

428

Six -- On page 117 we find an ambiguity in the sentence which reads, "Although the extent of environmental effects of dumping contaminated dredge spoils in the marine environment are still unknown, recent research efforts have shown that "concerns regarding the release of toxic materials into solution phase during dredging operations and disposal are mostly unfounded."

Seven -- This Supplement has assessed the various disposal sites from the primary consideration of transport cost. While cost does indirectly affect all citizens, the far greater impact on the local fishing industry and sports fisherman is regarded with low priority. Yet it is reported that, "The catch in the Fishers Island-Race is the largest on Eastern Long Island, followed by Long Sand Shoals and Cornfield Shoals."

At least 20 lobstermen are in the Fishers Island area. Each tide produces approximately 100 pounds of lobsters at approximately $4,000 per man. What is the cost to the people who depend on the fishing industry for their livelihoo

and to the towns where they live? The assumption that dumping of spoil at New London can be considered independently of, and in isolation to the surrounding Sound waters fails to recognize the cumulative damage which will eventually cross that threshold of euthrophication. Thank you.

(Presentation by Shirley L. Bachrach was marked as Exhibit No.6.)

COLONEL CARVER: Thank you.

Virginia Moore.

MS. MOORE: My name is Virginia Bennett Moore, and I live in Southold and I am a member of the Conservation Committee of the North Fork Audubon Society, a 400-member chapter of the National Audubon Soceity. I have been asked by them to make the following statement:

The North Fork Audubon Soceity finds no reason for the Corps to reinstate the Navy's permit to resume dumping the dredged Thames sludge at the New London dumping ground.

We have at least summarily reviewed the Navy's April 1976 Draft Supplement to its

430

Final Environmental Impact Statement and, although the table of contents is authoritative and seems to ring out with environmental fairness, the contents themselves are inconclusive, contradictory, and far from reassuring.

We do not find them the basis for "minimal and short term" impacts, as the Navy does. In fact, nothing, so far as we can see has changed except to get a lot worse as we'll come to in a moment.

For example, in their initial summary they say, "Removal of polluted sediments from the Thames River would serve to enhance the commercial fishery by increasing the productivity of the estuary." If it can improve the river to remove the polluted sludge, how can they believe that dropping that sludge will fail to harm the living Sound? How on earth can Mr. Davis, the second speaker, conclude that it will actually help the New London fish?

They list various populations of that Thames bottom in Table 3-12, pages 55 and 56, as these: barnacle shell fragments, dead gastropods, mussel shells, dead hydroid skeletons

tar, oil, dead glass sponges, angelwing shells, one bryozoan skeleton -- did you get that word, I'm sorry, -- byrozon skeleton, and a few living Ulva fragments. At station 17N no living organisms were observed. They admit, in paragraph 6.13 following, that this Thames River spoil cannot be considered for beach nourishment because of the fine size and the polluted nature of the sediments, nor for sanitary landfill, nor even for strip mine reclamation. They did not deal with Cofferdam islands to contain the spoil, as some of us earlier suggested. They say that it will have no effect when thrown into the fastest channel of the Sound. And they volunteer that, paragraph 6.160, "The greatest commercial value of Long Island Sound lies in its use for sport, be it boating, sport fishing, or leisure. A very conservative estimate of the value is $10 million annually.

Now, here's the part that's worse. When the original Army permit was issued, the Navy had asked permission to dump 2.8 million cubic yards of spoil at the site over a period. Now

432

they are planning, paragraph 5.25, to dump about twice that 5.3 or 5.4 million cubic yards at the site, not all of it Navy. Most of this unforgiveable despoliation, paragraph 5.36, would take place before 1980. And 1976, our bicentennial year, would be the most active year.

In short, the Navy seems to be saying that because New London has been a dumping ground for 40 years, with the Sound deteriorating every year, and there's no other convenient place to put this mess, we're stuck with it.

We urge the Corps to refuse to reinstate this permit, and to remember that not only they but the EPA, paragraph 4.11, have a distinct legal obligation to protect us from unacceptable adverse effects on shellfish beds and fishery areas; effects on submerged vegetation; effects on food chains and species diversity; effects on the movement of fauna; and degradation of aesthetic, recreational and economic values. In this case, far more than the estimated $10 million worth of these values. Thank you.

(Presentation by Virginia Bennett Moore was marked as Exhibit No. 7.)

COLONEL GARVER: Thank you very much.

Charles D. Hardy.

MR. HARDY: Gentlemen, my name is Charles D. Hardy. I'm a taxpayer of Southold Town.

Since May 1973, the U.S. Navy has submitted a series of draft environmental impact statements, final impact statements and now supplements to final impact statements concerning the proposed New London Dumping Ground Project. This seris of statements have won the approval of federal agencies charged with responsibility of protecting the quality of our coastal waters. However, these statements to the present time have not withstood legal actions brought by concerned citizens who correctly assessed that glaring deficiencies existed in these documents.

The United States Court of Appeals for the Second Circuit ruled that the Navy's Environmental Impact Statement fail to satisfy the spirit and intent of both the National Environmental Policy Act of 1969, and the Federal Water Quality Amendments of 1972. In short, the U.S. Navy

434

with the approval of the Corps of Engineers and the Environmental Protection Agency broke the law.

One stipulation of several made by the U.S. Court of Appeals ordered the Navy to, "make a genuine effort in a truly objective fashion to evaluate and compare the qualities of all containment sites and to select one on the basis of clearly stated data and reasoning." I respectively submit that this Supplement to the Final Impact Statement is in contempt of the above quoted section of the Court's decision for reasons I would like to briefly outline.

An atmosphere in which data can be evaluated in an "objective fashion" can only be created where the clouds of conflict of interest are absent. Such is not the case in the monitoring study which was conducted at the New London Dump Site. Here we find that the principal investigator of the prime contractor of the study, the National Marine Fisheries Service, Sandy Hook Laboratory, is also chairman of the Interagency Scientific

Advisory Subcommittee on Ocean Dredging and Spoiling. This committee was established to make recommendations to the Corps of Engineers of acceptable dredge spoil dumping areas and also to make recommendations to the nature and extent of the sampling and monitoring to be carried out. Such a situation in which the prime contractor who is being financially reimbursed for his services to the tune, in this case, of many hundreds of thousands of dollars, also is strategically placed to serve as referee, consultant and reviewer in the design, execution and tone of the investigation.

Under such an incestuous closed loop system under the guise of objectivity, the pressures for human bias are enormous. The design, implementation and conduct of acceptable scientific investigations requires peer review from outside the system.

One premise made by the Nay is the belief that the New London Dump Site is a containment site where environmental conditions exist wish preclude the dispersal of the spoil beyond the boundaries of the dumping area.

A containment site is necessary for this particular dredging project since the spoils are characterized as polluted by failing to satisfy dredge spoil disposal criteria of 1971 or Ocean Dumping Criteria of 1973 established and regulated by the Environmental Protection Agency. However, in all the data submitted to date, the Navy has failed to establish that the New London Dump Site is a containment site, "On the basis of clearly stated data and reasoning," as ordered by the U.S. Court of Appeal. In fact, what little and inadequate data of currents supplied by the Navy indicate that the New London Dump Site is dispersive. Whether the dump site is dispersive or contained, hinges largely on the intensity of currents and turbulence to erode sediments placed at the site.

The Navy, using data and conclusions of an alleged and unpublished report by Morton et al 1975, clamed that a bottom velocity of 1.72 feet per second is necessary to erode the dredge spoils characterizing the Thames River.

If we accept this critical velocity as

valid it should be a simple matter to implement a routine study of currents using a moored array of current meters for periods of not less than one month at different seasonal periods. This is a common procedure for studies of this nature and commonly performed by recognized scientists. The Navy has submitted no data that this was performed. The Navy did not include the alleged current meter data collected by Morton et al at the New London Dump Site in their Final or Supplement Impact Statement. The Navy did base their conclusions that the New London Dump Site was a containment area on Morton et al study, while as the same time ignoring data that was supplied in the Impact Statement.

However, bottom current velocities of 1-1/2 to 2 knots were reported by subcontractors to the study, University of Connecticut scuba divers, which is equivalent to 2.5 to 3.4 feet per second. This exceeds the critical velocity necessary for erosion and dispersal of dredged spoils as determined by the Navy's own consultants.

Current meter measurements of a few hours

to a day's duration by the New York Ocean Science Laboratory, acting as subcontractors to the monitoring study, were apparently ignored by the Navy in the final analysis and assessment of the Impact Statement. These summarized data are given, however, in the Supplement. These current meter records show that maximum current speeds of 56 to 61 centimeters per second were observed which are equivalent to 1.8 to 2 feet per second. Such speeds again exceed the critical erosive velocity. It must be pointed out that both the scuba observations and the current meter data were all observed during optimum sea conditions. Measurements of current speeds at the dump site under adverse wind and wave conditions have never been measured by the Navy or its consultants. The embarrassingly small and limited current meter measurements revealed by the Navy clearly indicate that erosive velocities do exist at the New London Dump Site. Failure of the Navy to note this in the Final Environmental Impact Statement Supplement is a direct affront to the ruling of the Court of Appeals that

the Navy select a site "on the basis of clearly stated data and reasoning."

We must now address the contention of the Navy that the dredged spoils dumped at the New London Dump Site have shown little if any evidence of dispersion during the period of monitoring. This phenomemon was predicted by Dr. Bohlen of the University of Connecticut in previous testimony opposing the dumping project. Dr. Bohlen stated that the manner of barge dumping used deposits the dredge spoil in a cohesive pile. Due to the polluted nature of the spoil it will take some time before burrowing marine organisms begin to breakup the spoil deposit. The period of the monitoring survey was much too short for the combined action of increasing biological activity in concert with the high maximum current speeds to sweep these polluted spoils westward into Long Island Sound.

The Navy would do better to consider locations which offer environmental characteristics more fitting to the designation of containment. Such locations appear to exist in Rhode Island

and Block Island Sound and southest of Block Island.

As an aside, there is a rumor among the scientific community that these spoils have moved and this may or may not appear in the forthcoming quarterly report. Thank you.

(Presentation by Charles D. Hardy was marked as Exhibit No. 8.)

COLONEL GARVER: Thank you very much, sir.

A comment you made early in your statement, I think bears a little additional comment by me at this time.

You made reference to the fact "your statement fact that the Supplement Environmental Impact Statement, among others, have won the approval of various federal agencies including the Corps of Engineers." I would like to remind everyone that the meeting this evening is a part of the process of determining whether it will meet the approval. The issuance, denial, modification of the permit is in question and will not be decided until the transcript of tonight's meeting is reviewed in quite some detail. Thank you very much.

MR. HARDY: Colonel, I respectively submit that the previous track record kind of predicts what the outcome will be.

COLONEL GARVER: Thank you.

Merlon E. Wiggin.

MR. WIGGIN: Good evening, Colonel, ladies and gentlemen. I represent the North Fork Environmental Council, and I make these comments on behalf of the North Fork Environmental Council which consists of over 400 members and represent many citizen groups on Long Island's North Fork.

We feel that environmental considerations are important in modifying projects such as this, but we realize that economic and national security considerations must also play an equally important role.

447

Consequently, we adopt a cooperative spirit in replying to the Draft Supplement Final Environmental Statement. Our major criticism of the Draft Supplement are based on the following points:

No. 1 -- We wonder how effective the re-evaluation of data will be following the completion

of the NAVSUBASE dredging. It is far too simple to use the same dump site rather than to dump selectively, or choose alternative means of spoil disposal. This re-evaluation becomes particularly important in the light of current studies on dumping management by the Marine Resources Research Center group under Dr. Schubel at SUNYSB.

Clearly, the need for oil spillage corrections and sewage disposal improvements are indicated at the Base and on the Thames overall. Is there sufficient impetus to carry these programs out or will we have to accept delays and foot-dragging and more polluted spoils to handle?

We are dismayed by the fact that there is still no bi-state organization with clear-cut jurisdiction to deal with a problem such as this.

We object to the spirit with which ocean dumping is simply accepted as an alternative means and dismissed on economic grounds. It is ironic to read of dumping sites considered under the provision of Marine Protection, Research,

and Sancturies Act. Recent research in the New York Bight and the Hudson River are proof that ocean dumping may not be acceptable on a large scale as a long term method of waste disposal.

I have the section-by-section critique of questions which I will omit as it is included in the statement provided.

COLONEL GARVER: Thank you, sir.

MR. WIGGIN: In conclusion though, in the summary conclusion, we ask you to vie more than lip service to the intent of the applicable environmental laws and acts, but instead, charge yourselves as representatives of the United States Government to act courageously and without hesitation to equally defend and protect our environment and natural resources as a heritage important to all of us. Thank you.

COLONEL GARVER: Thank you, sir.

(Presentation by Mr. Wiggins was marked as Exhibit No. 9.)

The interpretation of the track record is, of course, in the eyes of the beholder. We will give more than lip service to review

of this permit, I most assure you.

Natalie R. Rafferty.

Ms. Rafferty: My name is Natalie R. Rafferty, and I'm Conservation Chairman of the Fishers Island Civic Association. I'm here tonight in behalf of the Fishers Island Civic Association.

We are still gravely concerned with the concept of the New London Dump Site as a containment site rather than a dispersal site. We are still gravely concerned about the spoil material to be dumped in the New London Dump site. As you know, we were one of the many plaintiffs in the law suit. We, and other plaintiffs, will be further represented by legal and scientific persons tomorrow night at the Groton, Connecticut hearing.

I must say I was disappointed that we were given so little time to review this Supplement EIS, and many questions still remain unanswered. Thank you.

COLONEL GARVER: Thank you.

Joan H. Tiedke..

MS. TIEDKE: Is it appropriate just to ask

a question?

COLONEL GARVER: You may ask questions. Please address your questions to me. I may answer them, or refer to someone else to see if he would like to.

MS. TIEDKE: In the chart which showed ranking to sites according to their retention ability and biological activity, et cetera, was determination of that ranking made in consideration of the polluted quality of the spoil, or would that ranking apply to the dumping of so-called clean spoil?

COLONEL GARVER: Okay. Lt. Norris, would you like to have that question answered?

LT. NORRIS: Do you have that table number?

MS. TIEDKE: I don't think the table number would be significant particularly. Did you consider it as being suitable for polluted spoil only, or would you use the same ranking if this spoil were clean?

MR. DAVIS: Ma'am, the ranking was in terms of Thames River dredged spoils, particularly silt size spoils. If we, for instance, been dealing with sand the rankings would have had

774

to be somewhat different. It would have been a different site for sand.

MS. TIEDKE: In other words, you did consider that this is polluted spoil?

MR. DAVIS: Yes, ma'am.

MS. TIEDKE: All right. Somewhere in this presentation spoil upgrading was mentioned as one of the possibilities of getting rid of this I assume; but I don't quite understand what this is. Could someone explain?

COLONEL GARVER: I don't quite understand your question. Could you repeat that again?

MS. TIEDKE: I believe the first item in a list of methods of disposal was spoil upgrading.

COLONEL GARVER: You'd like an explanation of the term "spoil upgrading."

MS. TIEDKE: Yes, and why there was no further mention.

MR. DAVIS: Basically spoil upgrading is a series of techniques which are just being developed now for removing metallics or oil and grease or whatever from dredged materials. Unfortunately, they are not terribly well

developed right now. They are being studied, in fact, in Vicksburg and in other places for possible future application. They simply aren't ready to go on line now. They are clean-ups.

COLONEL GARVER: Unfortunately, wherever we get involved in any engineering, we are limited by the state of the art.

MS. TIEDKE: Of course, unfortunately. What kind of limits have been put on Dow, Electric Boat and the SUBBASE, et cetera. Are there people, previously at least, who have dumped a great many chemicals and pollutants into the river?

COLONEL GARVER: The Environmental Protection Agency is responsible, of course, for the limits of present pollution; and I don't believe that anyone here this evening is in a position effectively to answer that question. That question could easily be addressed, however, to the Environmental Protection Agency and an answer obtained from them.

448

MS. TIEDKE: Yes, I'm aware of that, but

someone mentioned because the dredging would affectively clean up the Thames River and make it more habitable, I wondered how many more contaminants will be continually dumped into the river as they were in the past?

COLONEL GARVER: I'm sure we have opinions, but I don't think it would be fair to them to give them.

MS. TIEDKE: I may have missed it. I didn't read every page of your latest volume, but was there any table anywhere listing what radial nuclides might be in this spoil?

LT. NORRIS: There was a section on impact of nadial nuclides.

MS. TIEDKE: And did you consider, as someone else mentioned, the various nuclear power plants that are ----

LT. NORRIS: No, ma'am, I didn't. I was specifically concerned with the Thames River spoils.

MS. TIEDKE: Is it possible that there could be interaction with contaminants from other areas besides the Thames River spoils?

LT. NORRIS: I don't know that. I would

have to ask somebody a little more knowledgeable about that.

COLONEL GARVER: The question, of course, in their study was to take what is existing in the Thames River spoil. The material would be dredged and then, therefore, dumped somewhere. This is what their study addressed.

MS.TIEDKE: I understand. I would think in dumping something that is known to be contaminated with various things, heavy metals and chemicals, you would also want to know whatelse might be in the area, or might be eventually added to that and what the cumulative effects might be.

COLONEL GARVER: Okay. This is perhaps a very good point which we will take into consideration in our review of the Supplement. We will look into whether or not such a consideration is something that was omitted and should have been covered or whether it was something which could not be covered by state of the art. I don't know at the moment which answer might come out, but we will review that.

450

MS. TIEDKE: Thank you.

COLONEL GARVER: Are there others present who would like to make a comment?

Yes, sir.

MR. MILLICK: Good evening. My name is Peter Millick. I'm from the firm of Butzel and Kass. We present the plaintiffs in the suit against the Navy and the Corps concerning Fishers Island and I'm here on behalf of the plaintiffs. Many of them have already made statements here now. I assume others will make statements tomorrow. I would like to make this statement now. We will be submitting written statements within the 10-day period.

The standard set for Impact Statements in the Second Circuit decision is full disclosure and the order of Judge Blumenfeld which affected that decision mandates a genuine effort and truly objective fashion to the preparation of the Draft Supplement. It's against these standards that the Draft Supplement must be judged, and it is under these standards that we believe the Navy has failed to comply.

I would like to address several different aspects that were covered in the Draft Supplement. First I would like to talk about movement of spoils. The Navy persists in characterizing the New London Dumping Ground as a containment site and notes only minimal erosion has occurred of the dredged spoils that were dumped there in '74. This conclusion as to moving of spoils did not justify by the facts revealed in the last Supplement itself. The last Supplement indicates that 95 percent of the dumped spoils have remained at the site. The implication is that 5 percent have moved. If you extrapolate that over ten years one might assume that half the spoils will move within that period. 452

Moreover, the validity of the measurements of dispersion of the New London Dumping Grounds taken by the Navy are subject to serious question. First, the measurements were taken on one day, August 13, 1975. No measurements have apparently been taken in the last 10 months. No assessment has apparently been made in the winter storm season that just passed.

Second, the Navy admits that its own August 1975 assessment of scouring or winnowing and subsequent transport from the site was "inconclusive and required furthur analysis." This analysis has apparently not been made.

Third, according at least Appendix K to the Draft Supplement, even the Navy is willing to say only the transport from the site may be minimal.

Finally, and most important is our understanding that there are other additional studies that have been carried out and that is the 5th, 6th and 7th quarterly reports. These reports, we believe, should be immediately circulated to all those parties who received the Draft Supplement and a further hearing should be held to afford the public an opportunity to comment on them.

As to short-term and long-term impacts of dumping spoils, the Navy in the Draft Supplement asserts that there are no short-term adverse impacts and no long-term impacts for dumping in the New London site. In making

such assertions, the Navy ignores other findings that it made itself in the Draft Supplement.

First, the Draft Supplement cautions that fishing at the disposal site "Should be discouraged since the extent of sources of contamination in organisms frequenting disposal sites have not yet been determined." If even this short-term impact on fish is in such doubt, how can the Navy assert that there are no short-term adverse impacts.

Second, it is not clearly stated in the Draft Supplement that the spoils to be dredged in Phase II of the project is significantly more polluted than the spoil from Phase I. Whatever impacts produced by Phase II, therefore, would only be magnified with the Phase II sediments. I mean whatever impacts were produced by the Phase I sediments would only be magnified with Phase II sediments.

Third, the Draft Supplement indicates that on-going studies on the long-term impact of dredging are "inconclusive and that such impacts will not be determined in the 'near

future." The public is entitled to know more about the status of these studies, the findings to date and the expected target date for completion of such studies, otherwise the public cannot determine whether it will be willing to suffer now the threat of possible, significant, adverse, long-term impacts.

Fourth, as long as the impacts do remain unclear, short-term or long-term, logic requires that the risks be avoided to the greatest extent possible. This suggests moving away from a site like New London which is so close to spawning grounds and other recreational uses on the Connecticut Shore, Fishers Island.

Now, I would like to address the comparisons between New London and other sites. The Second Circuit decision puts great stress on the need to consider alternatives adequately. While the Draft Supplement presents more data on the various alternative dump sites, the presentation of this data is misleading and inaccurate especially in the case of East Hole.

The most basic criticism of the Draft Supplement in this regard concerns sediment assessments and current measurements at various sites, and the conclusions drawn on the basis of such measurements and assessments. The Supplement relies without explanation solely on the size of the bottom sediment particles to determine the containment rating of the various sites.

The Draft Supplement makes an effort to describe the possible origin of such particles in some cases but not in others. Thus, for example, the coarse materials found at New London is assumed to be a lag deposit and not the result of winnowing, while no effort is made to explain the origin of the sand sediment at the East Hole. But on the basis of such sediment, the East Hole is characterized as only a marginal containment site.

As to the current measurements, the curve measurements, the Navy compares bottom tidal currents and other currents. An important factor, of course, is bottom currents since it

456

is at the bottom where the spoil will be sitting and subject to the waves and tide.

In terms of bottom tidal and bottom storm currents, East Hole, for that matter Containment Site 1, is clearly superior to the New London Dumping Ground. Bottom tidal velocity at East Hole is 1.22 feet per second. That comes from the Draft Supplement. While bottom velocity at New London is 1.7 feet per second, significantly higher.

It should also be noted that maximal tidal, this is not storm velocities at New London, were reported by the New York Ocean Science Lab to be 2 feet per second and 1.9 feet per second on February 28, '75 and May 21, '75. These are in excess of the 1.7 feet per second erosion producing velocity which is cited by the Draft Supplement which was also noted by Mr. Hardy. Nevertheless, New London is given a higher rating than East Hole on its containment scale despite the fact on the findings of these measurements. Noteworthy too that the Draft Supplement describes a bottom current at East Hole as

producing "friction velocities that are significantly less than those required to erode the spoil material." Yet,the conclusion that East Hole is only a marginal containment site stands and New London is again given a higher rating than East Hole on the containment scale in the Draft Supplement.

The Supplement also says on the basis of bottom currents that the Rhode Island site, which was called the containment site in the revised Draft EIS a few years back, can be expected to "contain these sediments much of the time." Yet, Rhode Island is given the lowest, possible retention rating on the scale. 85x

The same criticism can be made of other criteria used by the Navy in comparison of different alternatives. For example, the Navy did not consider proximity to major recreational waters, nursery and wetland areas as a criteria. No account was taken of the fact that East Hole is further away from recreational waters, nursery areas and wetland than the New London Dumping Ground; and if the spoil were to move from the East Hole it would

have further to go before causing further adverse impacts. The Draft Supplement instead considered only whatever fishing was done right at the proposed site. Thus, an already used site like New London was highly rated because dumping had already destroyed the site and little fishing remaind. A site like East Hole got a lower rating though there was, according to the Suppelement, only negligible fishing at the site.

Furthermore, East Hole and containment site 1 are given short shrift because of alleged other uses of the dump site, yet nothing is said in the Supplement about how filling up part of East Hole or containment site 1 will interfer will periodic use of the FORACS or the acoustic range.

Finally, the utilization of the regulatory criteria seems completely without merit. The clear purpose of the Second Circuit requiring the Navy to consider all feasible alternative sites was to require it to generate and evaluate information on such sites. Now the Navy says that sites like East Hole or

containment site 1 must rank very low under the regulatory criteria on the Navy's chart because of the "current lack of information available as to their characteristics and suitability at the disposal site and the difficulty and expense of obtaining such information." You may ask just what the Navy has been doing these last 10 months, how can it compare sites about which it lacks and fails to seek information. The program at New London was meant to assess and not to justify by its very distance further dumping at New London. In sum, evaluation and comparison of the various sites presented in 460 the Draft Supplement are faulty and misleading commended pursuant to the foregoing comments it might well just demonstrate that the East Hole or some other site is superior to the New London Dumping Ground.

I have some other comments to make. They are very brief. I'll soon be finished. First I would like to make brief note of the Navy's discussion of alternative disposal techniques. Many of these descriptions are

very brief. They don't give much information from which an average reader can gather what is actually going on. For instance, the Navy notes the possibility of using the spoils in waterfront disposal for parking lots but did not follow this suggestion up in any way. It notes that island building would be "really very expensive,"but gives the reader no details as to how just expensive it would be or what other sites might be available for this purpose.

I would also like to touch briefly on the absence of regional dumping plans. The Draft Supplement states that the Corps of Engineers, "For the past several years has made an intensive effort to bring various agencies into agreement on the best location of dump sites in Long Island Sound." This has been almost two years since, on behalf of our clients, we urged the Navy and the Corps of Engineers to make an assessment of the effects of dredged spoils on the Sound as a whole. Yet, despite our urgings and the Corps efforts, no regional assessment has even been initiated

much less completed; meanwhile over 5 million cubic yards of spoils will be dumped at other sites in the Sound including New London. Five million will be dumped in New London, millions more will be dumped elsewhere, and there's no regional assessment of just what's going on. It seems like the Corps and the Navy are intent on nickling and diming the Long Island Sound to death without regard for any regional assessment with adequate possibility for public comment. Thank you.

COLONEL GARVER: Thank you, sir.

ARe there other comments. Yes, ma'am.

MS. HOUGH: My name is Ann Hough. I'm Executive Director of the Long Island Sound Task Force, The Chapter of the Oceanic Society. The society has over 4,000 members in the Long Island Sound area.

Mr. Millick has expressed a number of our concerns about this project and we'll submit further comments. I would just like to make one brief point tonight.

Our chief concern with this project is with all proposed dumping in the Sound as it

462

is only the smallest step towards a comprehensive plan for management of dredging around Long Island Sound. As long as you continue to divide the Sound into bits and pieces and to handle each project and area without regard to the rest of the Sound, you automatically close off a variety of options which might provide a much better solution to dredged spoil disposal throughout the Sound.

We urge that you undertake such a long-range assessment immediately, and that until it is completed you exercise great caution on any dumping in Long Island Sound. Thank you.

COLONEL GARVER: Thank you very much.

Are there other comments? Yes, sir.

FROM THE FLOOR: I would like to ask a few questions.

COLONEL GARVER: Yes, sir. Please address your questions to me, however.

MR. HARDY: My name is Charles Hardy, resident of Southold. In the May 1973 Draft Environmental Impact Statement, your consultant Jason Cortell, I believe, categorized New London

Dump site as a dispersive area and he left it and advised the Navy to choose the Rhode Island Sound Dump Site, I think also called Brenton Reef; yet, seven months later in the December 1973 Final Environmental Impact Statement the recommended Rhode Island Sound Dump Site was masked out and the New London Dump Site was put in using the same data base. Could you explain? This is ther -- it has always been a mystery to me.

COLONEL GARVER: I can't offhand myself explain the data base, I'll go to the Navy in a moment. However, an important factor that enters into the calculations are the fact that time has passed and in that time a lot of things have been done. A lot of understandings have changed. The state of the art has grown somewhat. All of that enters, but relative to the use of the same data base -- does this provide basis for an answer? Do you have another question, sir?

MR. HARDY: Yes, I do. I was amazed to learn tonight that in the area of the New London Dump Site waves 26 to 32 feet high have been

been reported. This somewhat scares me. I was wondering if in reality the data base which was used by Mr. Davis if it's the same one that I am familiar with. This is the, I think, Weather Observations of the U.S. Naval Weather Command, which has a primary -- I'm recalling this from memory now. My dates may be crossed, but I think it has a primary weather record of 68 years. This is observed from ships log; and that in actuality Region 6 is located, as I recall, in an area defined by the New York ---- Actually the center of this area is 30 miles, approximately 30 miles south of Long Island, and that Region 5, I believe, or I would guess in this case, not believe, probably lies to the east of this and it's probably the center of these weather observations from the ships offshore platforms and so forth, lies also 30 miles south of Martha's Vineyard. Would these weather observations be realistic for the near shore and relatively protective waters of Long Island Sound?

COLONEL GARVER: I would like to partially answer what I think is your question. Relative

to such high waves on the surface, this does not necessarily indicate the magnitude of any force at a given depth below the surface. I have heard a number of scientific discussions on the subject; and if your question was do those waves noted in other areas, are they represented by similar sizes of waves in the Sound, I'm not sure that anyone here knows the answer specifically to that question.

MR. DAVIS: We did use the same data basis you referred to,The Summary of Synoptic Meteorological Observations, and the 26 to 32 foot waves were the peak that were recorded in the two zones which you did describe correctly. They recorded, I believe, once in zone 6 and twice in zone 5. They were included to show what the highest peak in the whole zone was, the 90 percent waves. The 8 foot in zone 5 and the 6 foot waves in zone 6 are much more common observations; but in dealing with those observations they are from all over the zone not just from the center point. They include observations of Long Island Sound and of Block Island Sound and Rhode Island

Sound. If anything they represent larger waves than you would expect in more inland waters.

COLONEL GARVER: Do you have another question?

MR. HARDY: Yes, one third question. In the quarterly report, the National Marine or Sandyhook Lab Scuba Diving, they mentioned several times that diving times were limited to 20 minutes in the dump site area. No reason was given for this short diving period.

COLONEL GARVER: Would you care to answer that question as to why your divers were limited to 20 minutes.

MR. REID: I believe I can. We're diving in anywhere from 60 to 80 feet of water, and at 80 feet the residual time, nitrogen and so on, might give you 40 minutes, but with rapid swimming either with or against the current trying to limit the size of the spoil pile, it was a combination of nitrogen time and sometimes just running out of air within the 20 minutes.

MR. HARDY: I think at 70 feet by the

Navy Diving Table, or at least the old table, is approximately a half hour, I think. You say you consume great energy because of the current?

MR. REID: Yes, we do.

MR. HARDY: Thank you.

COLONEL GARVER: Thank you

Are there other comments or questions?

Yes, sir.

MR. SHAY: Colonel, John Shay again. I was wondering how long will it take to conduct Phase II of the dredging and disposal?

COLONEL GARVER: If Phase II is conducted, how long would it take.

468

LT. NORRIS: I would like to direct that question to Commander Hornned(phon.) who is the Public Works Officer at the Naval Submarine Base at New London.

COMMANDER HORNNED: Commander D.W. Hornned, Public Works Officer at the Naval Submarine Base, and resident officer in charge of construction for Naval Facilities Engineering Command Contracts there.

The Navy's general schedule for the

Phase II dredging that we're talking about would generally run from about -- this is generalized -- from about, we have a target shown here for roughly November of 1976 and the channel dredging would run and complete in about February of 1978. Based on this target schedule November '76 to February '78.

COLONEL GARVER: That would be a 15-month period if permit is issued and the dredging is conducted.

MR. SHAY: Perhaps I could ask if there is an initial phase of the dredging to allow the submarines to be brought up to the fitting point. I forget the exact terminology for the point where the submarines will be fitted with electronic equipment. How long would that initial phase take?

COLONEL GARVER: If there is a breakdown of the dredging into sections, is there a section that would allow the bulk of what the Navy wants done, and if so, how long would that section take to be dredged?

LT. NORRIS: There has been a couple of terms used in both the Draft and the Final.

I would like to explain. First increment, dredging was dredging from the channel entrance to the Gold Star Bridge. That's been completed. Second increment, dredging is from the Gold Star Bridge up to the Submarine Base. There is some additional dredging that we are constructing and some other piers that we are repairing and make it appropriate for the SSN-688 submarine.

First we would have to get the channel dredged. That means we get the submarine up to the base. Then we have to get some dredging done at the pier so we can get the submarine alongside the pier. As far as getting any kind of dredging accomplished, prior to doing second increment on the pier work, I have no knowledge of that. Perhaps Commander Hornned has some knowledge.

COLONEL GARVER: Would you care to answer?

COMMANDER HORNNED; Let me try to address the question by saying that as part of the Navy's overall project to accommodate the 688 class of submarine, it is necessary for us to construct a new pier at the Submarine

Base that is, in fact, capable of berthing that vessel. At the present time, there is no pier at the Submarine Base at which this vessel can be adequately berth. During the process of constructing our new SSN berthing pier and also in the process of constructing a mooring facility for a medium floating dry dock, we will create with the new pier two adequate berths and ancillary to the construction of the facility for the dry dock one adequate berth. These berths, the new submarine pier, is at the northern -- not the northern most boundary, but it will be the northern most pier at the base. That is, the farthest pier up river since of course the piers have generally been constructed from down river, up river. Therefore, in order for us to get the 688 submarine into one of the adequate berths for it at the new pier it is necessary for the Phase II dredging to be all the way up to that pier and beyond. In fact, on the charts you saw earlier the dredging goes to that pier and then there is a small turning basin to the north of that pier.

Does that answer your question?

MR. SHAY: Yes. I'm just trying to get an idea what time constraints the federal agencies are under because in the Draft Supplement, paragraph 1.17, there is a discussion that the channel dredging should be completed by October '77. Have all the labor disputes been fully resolved now? Is it the Army and the Navy that's -- are they really under serious time constraints here?

COLONEL CARVER: The time constraints would, of course, be time constraints of the Navy. Relative to disputes, I am quite sure that the Navy has made a determination.Either they've been settled or they anticipate their being settled in time that they will not affect this. I believe the schedule that the Commander mentioned is the one that they consider to be bearly meeting their time constraints, possibly even failing a little bit to meet their time constraints,but not yet dangerously so.

MR. SHAY: And upon the close of the proceedings in Connecticut and the close of

472

the 10-day comment period, how long do you anticipate the decision to be off in the future?

COLONEL GARVER: I can't really answer that question because we have to review these comments. I know what we have said this evening. I can visualize how long it will take to carefully review these comments, but a number of the comments in fact require us to think in some areas we haven't been thinking in before. We're going to have to apply a little bit of additional thought in some other areas. I don't even know what they are going to say tomorrow night. I can't tell you. I do know that the Navy is going to be rapping us, trying to get a decision from us, but I can't give them a guarantee when I'll give them a decision.

MR. SHAY: The Army has not, as of yet, set any ballpark figures for a number of months.

COLONEL GARVER: We refuse to be pinned down by an applicant as to how long we're going to take to give them a decision. We

473

have to consider the public interest and that public interest takes into account a lot of things that we might not even think of until we start digging into some of this material. We won't be pinned down relative to a time constraint. The Court could add an additional time constraint that we wouldn't even visualize perhaps. We must report to the Court as my counsel just reminded me.

MR. SHAY: Thank you.

COLONEL GARVER: Thank you.

Are there other comments or questions?

(No response.)

Before closing I would like to remind each of you that written statements may be submitted to our office within the next 10 days. These statements will be entered into the record and will be afford equal consideration with everything that's been presented tonight.

On behalf of everyone attending here this evening, I extend our appreciation to Mr. John Kalish the District Principal for making this place available for us to use

tonight. I apologize for how hard the seats are in here this evening. We were scheduled to be in the auditorium, but there is a rather important dress rehearsal going on this evening that pre-empted us. Thank you very much for attending and foregoing the hard seats.

FROM THE FLOOR: Thank you for holding the meeting in Greenport.

COLONEL GARVER: The meeting is adjourned. Thank you.

(Whereupon, at 10:30 p.m., the meeting was closed.)

ATTENDANCE LIST

M. Mike Arabatzis
26 Federal Plaza
New York, N. Y. 10007

Shirley L. Bachrach
Dayton Road
Southold, New York

Aaron B. Donner
31 Thowbray Ave.
BayShore, N. Y.

John Fisher
47 Bacon Lane
Babylon, N. Y. 11702

Robert O. Ham
372 Tyler Ave.
Groton, Ct. 06340

Charles D. Hardy
Box 1143
Southold, N.Y.

Cor.D. W. Harned
46 Cavalla Court
Groton, Ct. 06340

Rudolph Hollman, Ph.D
Drawer EE
Mohawk, N. Y. 11954

James Homan
Stillwater Rd.
Cutchogue, N. Y.

Joseph W. Hudek
U.S. EPA, Region A
New York

Shirley Ketz
Greenport, New York

Michael Ludwig
212 Rogers Ave.
Milford, Ct. 06460

Albert M. Martocchia
Town of Southold,
New York

Don Middleton
50 Parmanske Ave.
Babylon, N. Y.

Vincent J. Monaster
26 Federal Plaza
New York, N. Y. 10007

Virginia Moore
P.O. Box 1195
Southold, N. Y.

Natalie R. Rafferty
Fishers Island
New York Conservation Ch.

William Terry, Jr.
Main Road
Orient, N. Y. 11957

Jean H. Tiedke
Box 1103
Southold, N. Y. 11971

Merlon E. Wiggin
P.O. Box 161
East Marion, N. Y.

Andrew R. Yerman
Bldg. #40, State University
of New York,
Stony Brook, N. Y. 11794

U. S. ARMY CORPS OF ENGINEERS AND U. S. NAVY

ANNOUNCEMENT OF JOINT PUBLIC HEARINGS

The U. S. Army Corps of Engineers and the U. S. Navy hereby announce joint public hearings concerning a suspended Corps of Engineers permit issued to the Navy to dredge approximately 2,800,000 cubic yards of material from the Thames River, Groton - New London, Connecticut, and dispose of the material at the New London Dumping Ground in Long Island Sound.

Hearings will be held as follows:

Wednesday, 9 June 1976

7:30 p.m.

Greenport High School

Southold, New York

AND

Thursday, 10 June 1976

7:30 p.m.

Fitch Junior High School

U. S. Route #1

Groton, Connecticut

On 25 November 1975, subsequent to the decision of the United States Circuit Court of Appeals in National Resources Defense Council, et al Callaway, et al (2nd Cir. No. 75-7048), dated September 9, 1975, the Corps of Engineers suspended a previously issued permit to the Navy to dredge 2,800,000 cubic yards of material from the Thames River and dispose of it at the New London Dumping Ground located in Long Island Sound at a point 200 yards southeast of a buoy set at 72° 05' 00" W, 41° 16' 08" N. The Corps is sponsoring the hearing under provisions of Section 404 of the Federal Water Pollution Control Act Amendments of 1972 and Section 10 of the River and Harbor Act of 1899 and pursuant to provisions of the Corps permit regulations, Title 33, Code of Federal Regulations 209.120 published in the Federal Register on 25 July 1975 and the Corps public hearing regulations Title 33, Code of Federal Regulations on 16 January 1975. The purpose is to solicit public comment to assist the Corps in reaching a decision on whether it is in the public interest to reinstate, modify, or revoke the Navy permit.

The decision whether to reinstate, modify, or revoke the permit will be based on an evaluation of the probable impact of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered; among those are conservation, economics, aesthetics, general environmental concerns, historic values, fish and wildlife values, flood damage prevention, land use classification, navigation, recreation, water supply, water quality, and, in general, the needs and welfare of the people, including the application of the guidelines promulgated by the Administrator, EPA, under authority of Section 404(b) of the Federal Water Pollution Control Act. The permit will not be reinstated unless it is found to be in the public interest.

The Navy is sponsoring the hearing for the purpose of obtaining additional public comment to a draft supplement to its Final Environmental Impact Statement (FEIS), originally published in December 1973. Also contained in the supplement are corrections of deficiencies noted in the Court's decision. The draft supplement statement is dated April 1976 and was filed with the Council on Environmental Quality on 30 April 1976.

RECEIVED
MAY 10 1 40 PM '76
NORTHNAVFACENGCOM

The permit as issued authorized:

The Navy to dredge a channel 7.5 miles in length and generally 500' wide to 36' below mean low water and two mooring basins to 38' below mean low water; and under Section 404 of the Federal Water Pollution Control Act of 1972 to discharge approximately 2,800,000 cubic yards of dredged material in New London Dumping Ground described as: an area one nautical mile square, the sides of which run True North-South and East-West. The center is at a point with New London Harbor Light bearing True 348° (N Mag.) distant 5,800 yards; and New London Light bearing True 359° (N by E Mag.) distant 4,425 yards. The depth of water varies from 63 to 72 feet at mean low water. Dumping will take place at a buoy set for that purpose and located at 72° 05' 00" W, 41° 16' 08" N.

The permit was conditioned to require a monitoring program under direction of the National Oceanic and Atmospheric Administration to detect any adverse environmental effects which may result from the dredging and disposal activity.

The Draft Supplement to the FEIS presents additional Navy dredging and pier construction requirements in the Thames River and the results of the monitoring program, an evaluation of alternative disposal sites and methods, and a discussion of other possible non-Navy dredging and disposal activities in the New London area. Copies of the Draft Supplement will be available at the hearings or may be reviewed prior to the hearings at:

Connecticut Locations:

Action Public Library, 60 Old Boston Post Road, Old Saybrook, CT 06475
Connecticut State Library, 321 Capitol Ave., Hartford, CT 06115
Connecticut State Library, Middletown Library Service Center, 786 South Main Street, Middletown, CT 06457
Groton Public Library, Fort Hill Road, Groton, CT 06340
Hartford Public Library, 500 Main St., Hartford, CT 06103
Ledyard Libraries, Ledyard, CT 06339
Mystic and Noank Library, Inc., 40 Library St., Mystic, CT 06355
New Haven Free Public Library, 133 Elm St., New Haven, CT 06510
Otis Library, 261 Main St., Norwich, CT 06360
Niantic Public Library, Inc., Main St., Niantic, CT 06357
Phoebe Griffin Noyes Library, Lyme St., Old Lyme, CT 06371
Public Library of New London, 63 Huntington St., New London, CT 06320
Stonington Free Library, Stonington, CT 06378
Waterford Public Library, 49 Rope Ferry Road, Waterford, CT 06385

New York Locations:

Fishers Island Library Association, Oriental Avenue, Fishers Island, New York 06390
Floyd Memorial Library, First St., Greenport, Long Island, NY 11944
John Jermain Memorial Library, Main St., Sag Harbor, Long Island, NY 11963
Southold Free Library, Main St., Southold, Long Island, NY 11971

Rhode Island Locations:

Newport Public Library, Aquidneck Park, Newport, R.I. 02840
Westerly Public Library, Broad Street, Westerly, RI 02891

and at the New England Division, Corps of Engineers, 424 Trapelo Road, Waltham, Massachusetts 02154.

We invite you to attend the hearings and to present your views and furnish specific data on the Navy's Draft Supplement to the FEIS and on any other factors affecting the Corps public interest determination described above.

For accuracy of the record, all important facts and statements should be submitted in writing to the chairman at the hearings or may be mailed beforehand to the Division Engineer, Corps of Engineers, 424 Trapelo Road, Waltham, Massachusetts 02154. Because of the extensive interest in this project and so that everyone has an opportunity to express his views, oral statements at the hearings may have to be limited. Please be prepared to summarize lengthy statements within a reasonable time limit and submit the full statement in writing. All statements, oral and written, will become part of the official transcript of the hearing and be available for public examination. Full consideration will be given to all views by both agencies; by the Navy in preparation of the Final Supplyment to the FEIS, and by the Corps of Engineers in determining whether it is in the public interest to reinstate, modify, or revoke the permit.

Please bring this notice to the attention of anyone you know to be interested in this activity.

RALPH T. GARVER
Colonel, Corps of Engineers
Acting Division Engineer

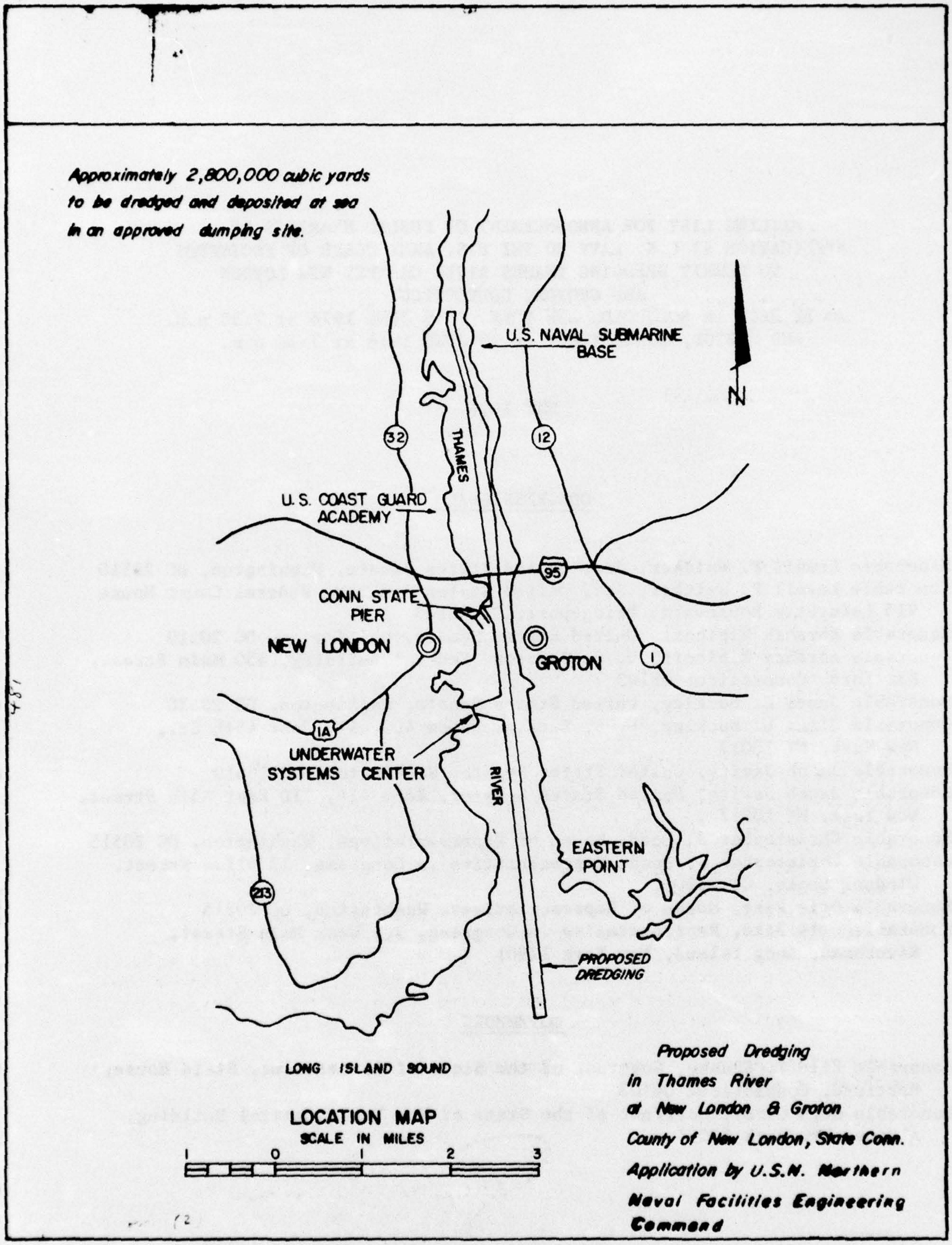
487

AD-A031 434 NAVAL FACILITIES ENGINEERING COMMAND PHILADELPHIA PA --ETC F/G 13/2
FINAL ENVIRONMENTAL IMPACT STATEMENT, DREDGE RIVER CHANNEL: NAV--ETC(
SEP 76

UNCLASSIFIED NL

6 OF 6
AD
A031434

END
DATE
FILMED
12-76



Approximately 2,800,000 cubic yards
to be dredged and deposited at sea
in an approved dumping site.
U.S. NAVAL SUBMARINE
BASE
N
32
12
THAMES
U.S. COAST GUARD
ACADEMY
95
CONN. STATE
PIER
NEW LONDON
GROTON
1
1A
UNDERWATER
SYSTEMS CENTER
RIVER
EASTERN
POINT
213
PROPOSED
DREDGING
LONG ISLAND SOUND
LOCATION MAP
SCALE IN MILES
1 0 1 2 3
Proposed Dredging
in Thames River
at New London & Groton
County of New London, State Conn.
Application by U.S.N. Northern
Naval Facilities Engineering
Command

MAILING LIST FOR ANNOUNCEMENT OF PUBLIC HEARINGS ON
APPLICATION BY U.S. NAVY TO THE U.S. ARMY CORPS OF ENGINEERS
TO PERMIT DREDGING THAMES RIVER CHANNEL NEW LONDON
AND GROTON, CONNECTICUT
TO BE HELD IN SOUTHOLD, NEW YORK, ON 9 JUNE 1976 at 7:30 p.m.
AND GROTON, CONNECTICUT ON 10 JUNE 1976 at 7:30 p.m.

MAY 1976

CONGRESSIONAL

Honorable Lowell P. Weicker, Jr., United States Senate, Washington, DC 20510
Honorable Lowell P. Weicker, Jr., United States Senator, Federal Court House
915 Lafayette Boulevard, Bridgeport, CT 06603
Honorable Abraham Ribicoff, United States Senate, Washington, DC 20510
Honorable Abraham Ribicoff, U. S. Senator, Federal Building, 450 Main Street,
Hartford, Connecticut 06103
Honorable James L. Buckley, United States Senate, Washington, DC 20510
Honorable James L. Buckley, U. S. Senator, Room 400, 110 East 45th St.,
New York, NY 10017
Honorable Jacob Javits, United States Senate, Washington, DC 20510
Honorable Jacob Javits, United States Senator, Room 414, 110 East 45th Street,
New York, NY 10017
Honorable Christopher J. Dodd, House of Representatives, Washington, DC 20515
Honorable Christopher J. Dodd, Representative in Congress, 13 Olive Street,
Windsor Locks, CT 06906
Honorable Otis Pike, House of Representatives, Washington, DC 20515
Honorable Otis Pike, Representative in Congress, 209 West Main Street,
Riverhead, Long Island, New York 11901

GOVERNORS

Honorable Ella T. Grasso, Governor of the State of Connecticut, State House,
Hartford, Connecticut 06103
Honorable Hugh Carey, Governor of the State of New York. Capitol Building,
Albany, New York 12224

FEDERAL INTERESTS

Commander, Eastern Sea Frontier, Attn: 332, 90 Church St., New York, NY 10007
Federal Energy Administration, 150 Causeway Street, Boston, MA 02114
U.S. Dept. of Commerce, NOAA, 439 W. York St., Norfolk, VA 23510
Regional Director, National Park Service, N. Atlantic Region, 150 Causeway St., Boston, MA 02114 (2)
U. S. Dept. of Commerce, NOAA, 14 Elm St., Gloucester, MA 01930 (2)
Regional Admin. EPA-Permits Br., JFK Federal Bldg., Government Center, Boston, MA 02203
U. S. Fish and Wildlife Service, Federal Bldg., P.O. Box 1518, Concord, N.H. 03301
U. S. Fish and Wildlife Service, P.O. Bldg., Boston, MA 02109 (2)
Office of the Chief of Engineers, HQDA (DAEN-CWO-N) James Forrestal Building, Washington, DC 20314
Director (730) Bureau of Land Management, Washington, DC 20240
Regional Director, Bureau of Outdoor Recreation, 600 Arch Street., Room 9310, Phila, PA 19106 (2)
Federal Aviation Administration, 12 New England Executive Park, Burlington, Mass. 01860
Federal Power Commission, Regional Office, 26 Federal Plaza, New York, NY 10007
New England River Basins Commission, 55 Court Street, Boston, MA 02108
Commander, First Coast Guard District, 150 Causeway St., Boston, MA 02114
Commandant, First Naval District, 495 Summer St., Boston, MA 02210
Director New England Area Office, Economic Development Area, U.S. Dept. of Commerce, 157 High St., Portland, Maine 04101
Resident Member, Board Engr. for Rivers and Harbors, Temp. Bldg. C., 2D and Q Sts., S.W., Washington, DC 20315
Director, Coastal Engr. Research Center, 5201 [illegible]

Commander, Eastern Sea Frontier, Attn: 332, 90 Church St., New York, NY 10007
Federal Energy Administration, 150 Causeway Street, Boston, MA 02114
U.S. Dept. of Commerce, NOAA, 439 W. York St., Norfolk, VA 23510
Regional Director, National Park Service, N. Atlantic Region, 150 Causeway St., Boston, MA 02114 (2)
U. S. Dept. of Commerce, NOAA, 14 Elm St., Gloucester, MA 01930 (2)
Regional Admin. EPA-Permits Br., JFK Federal Bldg., Government Center, Boston, MA 02203
U. S. Fish and Wildlife Service, Federal Bldg., P.O. Box 1518, Concord, N.H. 03301
U. S. Fish and Wildlife Service, P.O. Bldg., Boston, MA 02109 (2)
Office of the Chief of Engineers, HQDA (DAEN-CWO-N) James Forrestal Building, Washington, DC 20314
Director (730) Bureau of Land Management, Washington, DC 20240
Regional Director, Bureau of Outdoor Recreation, 600 Arch Street., Room 9310, Phila, PA 19106 (2)
Federal Aviation Administration, 12 New England Executive Park, Burlington, Mass. 01860
Federal Power Commission, Regional Office, 26 Federal Plaza, New York, NY 10007
New England River Basins Commission, 55 Court Street, Boston, MA 02108
Commander, First Coast Guard District, 150 Causeway St., Boston, MA 02114
Commandant, First Naval District, 495 Summer St., Boston, MA 02210
Director New England Area Office, Economic Development Area, U.S. Dept. of Commerce, 157 High St., Portland, Maine 04101
Resident Member, Board Engr. for Rivers and Harbors, Temp. Bldg. C., 2D and Q Sts., S.W., Washington, DC 20315
Director, Coastal Engr. Research Center, 5201 Little Falls Rd., N.W. Washington, D.C. 20016
Director, U.S. Army Engineer, Waterways Experiment Station, P.O. Box 631 Vicksburg, MS 39181
Commandant, Third Naval District, 90 Church St., New York, N.Y. 10007
Director, NOAA, National Ocean Survey, Dept. of Commerce, Rockville, MD 20852
Director, Atlantic Marine Center, National Ocean Survey, NOAA, 439 W. York St., Norfolk, VA 23510
Commanding Officer, Nav Submarine Base New London, Groton, CT 06340
Commanding Office, No. Div. Naval Fac. Eng. Command, Naval Base, Phila, PA 19112
Regional Environmental Control Dir., ECA, PHS Region 1, DHEW, JFK Federal Bldg., Boston, MA 02203
Regional Director, Northeast Region, Water Quality Office, EPA Rm 2302, JFK Federal Bldg., Boston, MA 02203
U.S. Navy Underwater Systems Center, New London Laboratory, New London, CT 06320
Director, Biological Laboratory, Bureau Commercial Fisheries, NOAA, Milford, CT
Regional Director, Northeast Region, National Park Service, 143 Third St., Phila, PA 19106
Commander, Third Coast Guard District, c/o Coast Guard Base, Governors Island, New York, NY 10004
Commanding Office, U.S. Coast Guard Academy, New London, CT 06320
Executive Director, Water Resources Council, Suite 900, 1025 Vermont Ave., NW Washington, DC 20005

Chairman, New England Regional Commission, 55 Court St., Boston, MA 02108
Coordinator, Northeastern Res. Devel. Assoc., NRECA, 2000 Florida Ave., NW, Washington, DC 20909
Regional Coordinator, Northeast Region, Dept. of the Interior, Rm 2003K, JFK Federal Bldg., Government Center, Boston, MA 02203
Supervisor Concord Area Office, Bureau of Sport Fisheries & Wildlife, Fish and Wildlife Service, Dept. of the Interior, 55 Pleasant St., Concord, N.H. 03301
Mr. Richard E. Griffith, Director, Northeast Regional Office, Bur., of Sport Fisheries and Wildlife, U.S.P.O. and Courthouse Bldg., Boston, MA 02114
Mr. Charles E. Knox, District Engineer, Geological Survey, U.S. Dept. of the Interior, JFK Federal Bldg, Room 2300, Boston, MA 02203
Mr. Frank Gregg, New England River Basins Comm., 55 Court St., Room 205, Boston, Mass. 02108
U. S. Environmental Protection Agency, Enforcement Division, Attn: Gus J. Bennett, Dir., 26 Federal Plaza, New York, NY 10007
U. S. Environmental Protection Agency, Region 2, Chief, Water Programs Branch, 26 Federal Plaza, New York, N.Y. 10007
U.S. Dept. of Justice, U.S. Attorney, Eastern District of N.Y., Federal Bldg., Brooklyn, NY 11201
U. S. Geological Survey, 5th Flood, Federal Bldg., Albany, NY 12200
Commander, Third Coast Guard District, Governors Island, New York, NY 10004
Commandant, Third Naval District, 90 Church St., New York, NY 10007

STATE INTERESTS

Mr. Marshall Ginther, S.E. Conn. Chamber of Commerce, 105 Huntington St., New London, CT 06320
Deputy Commissioner, CT. Dept. of Transportation, State Pier, New London, Connecticut 06320
Connecticut Development Commission, State Office Bldg., Hartford, CT 06115
Commissioner, CT Dept. of Agriculture & Natural Resources, Rm. 113, State Office Bldg., Hartford, CT 06115
Commissioner, CT Dept. of Public Works, Room 491, State Office Bldg., Hartford, CT 06340
Commissioner, CT. Dept. of Community Affairs, 1179 Main St., Hartford, CT 06340
Supervisor of Harbormasters, CT Dept. of Transportation, 60 Washington St., Hartford, CT 06106
Rhode Island Division of Coastal Resources, Veterans Memorial Bldg., 83 Park Street, Providence, RI 02903
Chief, Wetlands Division, Dept. of Env. Protection, State Office Bldg., Hartford, CT 06115
Dir., Water-Compliance, Dept. of Env. Protection, State Office Bldg., Hartford, CT 06115
Shell Fish Comm., State Docks, Rogers Ave., Milford, CT 06460
Dir., Water Res. Unit Dept. of Env. Protection, State Office Bldg., Hartford, CT 06115
NY State Dept. of Env. Conservation, Regional Supervisor of Env. Analysis, Bldg. 40, SUNY, Stony Brook, NY 11790

Mr. Eric Hatch, Chairman, CT Historical Comm., 59 Prospect St., Hartford, CT 06106
Mr. Terence Curran, Dir., Office of Env. Analysis, Room 416, NY State Dept. of Env. Conservation, Albany, NY 12201 (4)
Roy Linden, Comm. Bureau of Waterways, Ct. Dept. of Transportation, State Pier New London, CT 06320
Huntington Williams, Dir., State of CT, Council on Env. Quality, State Office Bldg., Hartford, CT 06106
Oliver Edstrom, CT Dept. of Env., Protection, Marine Region, P.O. Box 89, Waterford, CT 06335
Dir., CT Historic Comm., 59 South Prospect St., Hartford, CT 06106
NYS Seagrant Advisory Service, Marine Science Research center, SUNY, Stony Brook, NY 11790
Long Island State Park Comm., Belmont Lake State Park, Babylon, NY 11702, Attn: Mr. S. Shapiro
Port of New York Authority, Attn: Mr. Mathew Carrol, 111 Eighth Ave., New York, NY 10011
Mr. Joseph R. Stellato, Dir., of Waterways Maintenance, NYS Dept. of Transportation, 1220 Washington Ave., Albany, nY 12226
District Engineer, Dept. of Public Works, State of New York, 325 West Main St., Babylon, NY 11702
Dept. of Transportation, State of New York, 325 West Main St., Babylon, NY 11702
Nassau-Suffolk Bi-County Planning Board, Reg. Marine Resources Council, Attn: Dr. C. Williams Vet. Mem. Highway, Hauppauge, NY 11787
Suffolk County Council on Environmental Quality, Planning Building, Vet. Mem. Highway, Hauppauge, NY 11787
Suffolk-Co., Dept. of Environmental Control Marine Water Resources 1324 Highway, Haupauge, NY 11787
Suffolk County Water Authority, Sunrise Highway, Corner Pond Rd., Oakdale, New York 11769, Atn: Mr. L.W. Weinfurt
Commander, Eastern Sea Frontier, 90 Church St., New York, NY 12200
U.S. Dept. of Defense, Dir., Defense Mapping Agency, Hydrographic Center, Washington, DC 20390 Attn: Code NS12
Honorable Mary A. Martin, 34 Pegasus Drive, Groton, CT 06340
Honorable James J. Murphy, Jr., 257 Main St., Norwich, CT 06340
Honorable Richard F. Schneller, Box 205, West Ave., Essex, CT 06426
Honorable Robert D. Tobin, 10 Patrick Place, Niantic, CT 06350
Honorable Winifred A. Tanger, 15 Oil Mill Rd., Waterford, CT 06385
Honorable Richard R. Martin, 18 Raymond ST., New London, CT 06320
Honorable Patricia T. Hendel, 127 Parkway South, New London, CT 06320
Honorable Phylis T. Kipp, 58 Nantucket Drive, Mystic, CT 06355
Honorable Kenneth E. Stober, RFD 8, Box 48, Gales Ferry, CT 06335
Honorable Rufus Allyn, Ram Point, Masons Island, Mystic, CT 06355
Honorable Richard L. Mercier, 7 Railroad Ave., Plainfield, CT 06374
Honorable Dorothy Paulise, RFD 3, Bethyl Rd., Norwich, CT 06360
Honorable Thomas F. Sweeney, Box 1127, 14 Rose Garden Lane, Norwich, CT 06360

Honorable Leo H. Flynn, 76 Providence, St., Taftville, CT 06380
Honorable Samuel Gejdenson, RFD 1, Fitchville, CT 06334
Honorable Alan J. Mazzola, 82 Foster Drive, Willimantic, CT 06226
State of Connecticut, House of Representatives, State House, Hartford, CT 06103
State of Connecticut, State Senate, State House, Hartford, CT 06103
State of New York, State Senate, Capitol Building, Albany, NY 12224
State of New York, House of Representatives, Capitol Building, Albany, NY 12224

LOCAL AND REGIONAL INTERESTS

Selectmen, Town Hall, Uncasville, CT 06382
Selectmen, Town Hall, Montville, CT 06353
Selectmen, Town Hall, New London, CT 06320
Selectmen, Town Hall, Ledyard, CT 06339
Selectmen, Town Hall, Groton, CT 06340
Mayor, City Hall, Groton, CT 06340
Selectmen, Town Hall, Norwich, CT 06360
Selectmen, Town Hall, Waterford, CT 06385
Conservation Commission, Town Hall, Uncasville, CT 06382
Conservation Commission, Town Hall, Montville, CT 06353
Conservation Commission, Town Hall, New London, CT 06320
Conservation Commission, Town Hall, Ledyard, CT 06339
Conservation Commission, Town Hall, Groton, CT 06340
Town Library, Uncasville, CT 06382
Town Library, Montville, CT 06353
Town Library, New London, CT 06320
Town Library, Ledyard, CT 06339
Town Library, Groton, CT 06340
Dewitt Peterkin, 23 Wall St., New York, NY 10015
Harrison Eldredge, 36 Round Hill Road, North Haven, CT 06473
Sierra Club-CT Chapter, Hartford Env. Services Center, 60 Washington, St., Suite 611, Hartford, CT 06106
Albert Butzel, Berle, Butzel & Kass, 425 Park Ave., New York, NY 10022
The Long Island Sound Task Force, Suite 416, 50 West 40th St., NY, NY 10018
The Concerned Citizens of City Point, 294 Howard Avenue, New Haven, CT 06519
Al Leonard, Northern Marine Service, P.O. Box 209, Quinebaug, CT 06262
Nelson Porter, New England Tug Boat, Inc., 26 Rhoda Ave., Fairfield, CT 06430
Martin Piling & Lumber Co., P.A. Rechel, General Manager, 1080 Morris Ave., Union, NJ 07083
Robert Norman, Chairman, Sierra Club, Hanover, NH 03755
Hugh F. Mulligan, Gulf of Maine Research Center, Box 14, Durham, NH 03824
National Fishermen, 21 Elm St., Camden, Maine 04843
Mr. Robert Backus, c/o Devine, Millinet, Stahl & Branch, 1850 Elm St., Manchester, NJ 03105
M.E. Lemmerhirt, V/P, Great Lakes Dredge & Dock Co., 990 Rayway Av., Union, New Jersey 07083
Forest Products Division, Koppers Co., Inc., P.O. Box 488, Nashua, N.H. 03060, ATTN: Robert Shephard, Manger. Sales

LOCAL INTERESTS

Capt. K.W. Johnson, Jr., 300 Ocean Ave., Northport, NY 11768
Klein, Joel I., Dept. of Anthropology, NJY, Washington, Sq., NY, NY 10003
The Long Island Assoc. of Commerce and Industry, 131 Jericho Turnpike, Jericho, NY 11753
State Univ. NY, Oneonta Campus, Biology Dept., Attn: Chr., Oneonte, NY 13820
Students for Environmental Quality, Attn: Chairman, Bellport Senior High School, Beaver Dam Road, Brookhaven, NY 11719
Mr. William Y. Terry, Jr., Linden Farm, Orient Long Island, NY 11957
The Supervisor, Town of Southold, 16 South St., Greeport, NY 11944
The Town Clerk, Town of Southold, Town Hall, Southold, NY 11971
The Town Clerk, Town of Riverhead, 220 Roanoke Ave., Riverhead, NY 11901
The Supervisor, Town of Riverhead, 220 Roanoke Ave., Riverhead, NY 11901
Board of Supervisors, Suffolk County, County Center, Riverhead, NY 11901
Commission of Public Works, Suffolk County, Yaphank Ave., Yaphank, NY
Mr. John McHugh, Morrison-Knudsen Co., Inc., 777 Post Rd., Darien, CT 06820
Robert Humphrey, Mud Cat Div., 6 Old Coach Rd., Wilbraham, MA 01095
Lindgren Assoc., 1030 Fort Salonga Rd., Northport, NY 11768
James Caldwell, Pres., Ocean County Division, Ltd., 910 Boyd St., P.O. Box 401 Toms River, NJ 08753
Charles E. Pound, Cyclone Construction, Inc., 151 East Post Road., White Plains New York, 10601
Leon W. Cobb, 64 Crescent Ave., Lynnfield, MA 01940
JBF Scientific Corp., 2 Ray Avenue, Burlington, MA 01803, Attn: S. Bowen
Keystone Helicopter Corp., 1420 Phoenixville Pk., West Chester, PA 19380
DB&S Creosote Lumber Co., Box 504, Speonk, NY 11972
Folsom Marine, Joyce E. Folsom, Treas., 37 Pleasant St., Concord, NH 03301
Atlantic Diving Co., Parker St., Gloucester, MA 01930 Attn: W. Jebb
LB Foster Co., Attn: R. Nugent, 421 E. Central St., Franklin, MA 02038
Alexander Shaw, 193 Winding River Road, Wellesley, MA 02181
HB Fleming, Inc., Attn: R. Fogg, 89 Pleasant St., So. Portland, ME 04106
V. McBride, Aqua-Tech, Inc., P.O. Box 116, Lebanon, CT 06249
C.H. Slingluff, Jr., V.P. Atlantic Creosoting Co., P.O. Box 2120, Edison, NJ 07083
Hollis Sturdivant, Blue Water Marine Supply, Inc., 1000 Broadway at Channelside, P.O. Box 5457, Houston, Texas
Wyman & Simpson, 283 Water St., Augusta, Maine 04330
Amerada Hess Corp., #1 Hess Plaza Woodbridge, NJ Attn: G. Edge
DJ Scholl, 8 Ship's Bell Rd., Gloucester, MA 01930
Stanley Lucash, 96 Governors Ave., Milford, CT 06460
Richard Kidrick, 485 Greeley St., Manchester, N.H. 03101
Walter Thurber, City Planning Dept., 908 Elm St., Manchester, N.H. 03101
Richard Forrest, DKedgeast, Inc., P.O. Box 699, Baltic, CT 06380
Charles E. Pound, Pres., Aqua-Dredge, 70 Byram Ridge Rd., Armonk, NY
William Koelbel, Pres., Am-Can Marine Marketing Corp., 14 S. Morell St., Geneva, NY

LOCAL INTERESTS

City Manager, City Hall, New London, Connecticut 06320

City Council, City Hall, Groton, Connecticut 06340

Board of Selectmen, Town Hall, R.F.D. 2, Ledyard, Connecticut 06339

City Manager, City Hall, Norwich, Connecticut 06360

Mr. D.H. Dunn, Electric Boat Div., Dept. 393, General Dynamics Corp., Groton, Connecticut 06340

Mr. Paul Eddy, Eastern Connecticut Development Council, Groton Professional Bldg., Groton, Connecticut 06340

Mr. Ray Dolan, Center for the Environment and Man, 275 Widsor Ave., Hartford, Connecticut 06120

Mr. Daniel J. Carey, Dow Chemical Co., Allyns Point Div., Gales Ferry, Connecticut 06335

Mr. Arthur R. Tooker, New London Freight Line, 112 Pequot Ave., New London, Connecticut 06320

Mary B. Walton, Secretary, Save Our State Committee, Box 307, Jewett City, Connecticut 06351

Mr. William R. Zimmerman, Senior Vice President, Hess Oil and Chemical Div., Amerada Hess Corp., 1 Hess Plaza, Woodbridge, New Jersey 07095

Lt. Richard Swomley, Captain of the Port, Fort Trumbell, New London, Connecticut 06340

Mr. C.R. Mann, Chas. Pfizer and Co., Inc., Groton, Connecticut 06340

Mr. James D. Murphy, Connecticut Terminal Co., State Pier, New London, Connecticut 06320

Capt. Herbert I. Mandell, New London Hbr. Improv. Agency, 70 Greenway Road, New London, Connecticut 06320

Mr. Harry Picazio, Jr., Harbormaster, 76 Neptune Ave., New London, Connecticut 06320

President, Conn. Light and Power Co., P.O. Box 2010, Hartford, Connecticut 06101

President, Northeast Utilities Service Co., P.O. Box 270, Hartford, Connecticut 06101

Division Engineer, Penn Central Transportation Co., New Haven, Connecticut

New London County, League of Sportsmen's Clubs, Lynwood Page, Secretary, 41 Green Avenue, Jewett City, Connecticut 06351

Eloise B. Green, Box 1, Main Street, Southbury, Connecticut 06488

Clyde O. Sayre, Park Road, Watertown, Connecticut 06795

Walter J. Conn, 225 Danbury Road, New Milford, Connecticut 06776

Harold G. Harlow, Prospect St., Litchfield, Connecticut 06759

Samuel B. Hellier, Cedar Road, West Mystic, Connecticut 06388

John J. Morrison, 3 Eleanor Road, Enfield, Connecticut 06082

Rosario T. Vella, 122 Post Office Road, Enfield, Connecticut 06082

LOCAL INTERESTS

Mr . & Mrs. Howard L. Bachrach, Dayton Road, Southold, New York 11971
William J. Carew, RFD #1, Duryea Ave., Montauk, NY 11954
Hugo T. Casola, 413 Uggins St., Greenport NY
Mary A. Casola, 413 Uggins, St., Greenport, NY
Robert E. Chase, Federal Energy Adminstration, 150 Causeway St., Boston, MA 02203
John L. Clearwater, 46 Cavalla Court, Groton, CT
Gordon C. Colvia, Building 40, SUNY, Stony Brook, NY
Joseph Cosentino, 1907 Osbourne Ave., Willow Grove, PA
Steve Crandall, 6 Summerfield Place, Shelter Island, NY
Louis M. Demarest, Southold Town, NY
Mr. & Mrs. Kenneth O. Dickerson, Hammel Ave., Southold, NY
Aaron B. Donner, 3115 University Blvd., Bay Shore, New York
Barbara Dorman, et al, Main St., Greenport, NY
Mrs. W. Dove, New Suffolk Ave., Mattituck, NY
Francis Doyen, Fishers Island, NY
A. John Gada, Equestrian Ave., Fisheries Island, NY
Arthur J. Goldin, 135 Bay AVe., Greenport, NY
Stephen L. Gordon, NY State Dept. of Environmental Conservation
A.R. Grebe, Fishers Island, NY
Robert D. Ham, 372 Tayler Ave., Groton, CT 06340
Charles D. Hardy, Box 1143, Southold, NY
Scott L. Harris, Village Lane, Orient, NY
James Homan, Stillwater Ave., Cutchogue, NY
Catherine Jenssen, P.O. Box 214, Fishers Island, NY 06390
Edward Joyce, 115-79 229th St., Cambria Heights, NY 11411
Samuel and Sherley B. Katz, P.O. Box K, 736 Main St., Greenport, Long Island, NY
Anna L. and James P. Knowles, Indian Neck Lane, Peconia, NY
Daniel J. Larkin, NY State Dept. of Environmental Conservation, Building 40
SUNY, Stoney Brook, NY
Charles H. Lewis, 1 Lighthouse Road, Southold, NY
Michael Ludwig, 212 Rogers Ave., Milford, CT 06460
Albert Martocchia, 16 South St., Southold, NY
Richard H. Miller, Box 816, East Quogue, NY
Thomas Monsell, 525 First St., Greenport, NY 11944
Steven A. Monte, 1823 Grove St., Brooklyn, NY
Arthur Morecraft, 605 Willow Ave., Piscataway, NJ
Virginia Bennett More, Soundview Ave., South, NY
Mr. & Mrs. Tony Korkluh, Village Lane, Orient, KY
Philip W. McGrade, U. S. ARMY CORPS OF ENGINEERS, New York
Louis Pinata, 26 Federal Place, New York, New York
Edward Everett and Mrs. E. E. Post, White Hill Rd., Cold Spring Harbor, NY 11724
Natalie R. Rafferty, Fishers Island, New York
Mrs. Herbert Rosenbery, Town Harbor Line, Southold NY 11971

LOCAL INTERESTS

Samuel B. Hellus, Cedar Road, West Mystic, CT
Thomas F. Horan, Jr., 5 Beach St., Waterford, CT 06385
Thomas S. Hull, 262 Pequot Ave, New London, CT
Carlton D. Hunt, Marine Sciences Institute, Avery Point, Groton, CT 06340
Catherine Jenssen, Munnatawket Rd., Box 214, Fishers Island, NY 06390
Everett N. Jones, 4 Prospect St., Mystic, CT
John R. Kirkland, U.S. Coast Guard Academy, New London, CT
Charles and Michele Kripps, 48 Richards Grove Rd., Quaker Hill, CT
Daniel J. Larkin, SUNY, Stony Brook, NY 11790
Frederick J. Lawoureux, Naval Under Water Systems, New London, CT
Percy T. MacDonald, 29 Rockwood Dr., Waterford, CT
Capt. Herbert I, Mandel, 70 Greenway Rd., New London, CT 06320
Capt. Les Marsh,70 Dean Rd., E. Lyme, CT
Richard C. Michonski, 310 Nor Nldn Tpk, Montville, CT
Arthur E. Morecraft, 26 Federal Plaza, NY, NY 10007
Ronald Munro, 39 Peqasus Drive, Groton, CT
Donald L. Murphy, 21 Gorton St., New London, CT 06320

LOCAL INTERESTS

Mrs. Thomas W. Russell, Jr., Fishers Island, NY
Ronald Sake, 50 Maple St., Patchogue, NY
Walter L. Smith Box 754, Orient, NY
V. S. Spinella, Greenwood Road., ,ishers Island, NY
Loraine S. Terry, Box 311, Southold, NY
Orville Terry, Route 24, Orient, NY
William Y. Terry, Main Rd., Orient, NY 11957
Mrs. Jean Tiedke, Box 1103, Southold, NY 11971
Dr. M. Llewellyn Thatcher, 30 Euston Rd., Garden City, NY
John B. Tuthill, Orient, NY
Otto Uhl, Jr., 9 Derby Rd., Pt. Washington, L.I, NY 11050
Otto Uhl, III, 42 Sound Avenue, Greenport, Long Island, NY
Andrew R. Yerman, 11 Lendre Court, Pt. Jefferson,State, NY 11776
Lillie Ahman, Box 84, Fishers Island, NY
J.F. Bair, USCG Station, Ft. Trumbull, New London, CT
Linda E. Birelex, 593 Country Club Drive, Ledyard, CT 06339
A. G. Black, NUSC, N.L. Lab, New London, CT
Walter F. Bohlen, One Scott Lane, Mystic, CT
Edward Bonkempter, 16 Kingswood Dr., North Stonington, CT
Ruth G. Bowers, Box 147 Old Mystic, CT 06372
Dr. Floyd Breslav, 83 Bobwhite Trail, Gales Ferry, CT
Roy B. Britt, 17 Waco Ct., Groton, CT
Dr. John D. Buck, 15 Osage Lan, Noank, CT 06340
Victor V. Calabretta, 18 Crest Drive, No. Kingston, RI 02852
Dan Carey, 16 Moran St. Paucatuck, CT
Mrs. Betty Chapman, 163 Shore Ave., Groton, CT
L. J. Chmura, 236 Eastern Pt. Rd., Groton, CT
Cdr. John L. Clearwater, 45 Cavalla Ct., Groton, CT
George Cole, et al., Briarpatch Rd., RFD #1, Stonington, CT
John C. Cooke, 478 CowHill Road, Mystic, CT
Gordon, C. Colvin, SUNY at Stony Brook, Stony Brook, NY
L.L. Davis Whitehall Ave., Old Mystic, CT
Pat DeNois, 145 Storr Hill Rd., Groton, CT
Americo DeSista, 206 High St., Peace Dale, RI
Mr. & Mrs. John J. Dowling, Box 337, No. Stonington, CT
Dorothy B. Edwards, Hedge St. Fishers Island, NY
E. Perry Edward,Hedge St., Fishers Island, NY
Richard B. Erickson, Southeastern Conn. Regional Planning Agency, 139 Boswell Ave
Norwich, CT
Richard A. Erpenbeck, Fishers Island, NY 06390
Mrs. Edith Fairgrieve, 8 West Mystic Ave., Mystic, CT
Mrs. H. Lee Gerguson, Jr., Fishers Island, NY
A. John Gada, Equestrian Ave., Fishers Island, NY
James Gallagher, 14 Cove Drive, Niantic, CT
Lois C. Geary, 8 Woodland Drive, Groton, CT
Erwin Goldstein, RFD #1 Woluntown, CT 06384
Stephen Gordon, 1700 Broadway, New York, NY
Leslie Greiner, RFD #5, Norwich, CT
Steve G. Hapis, 54 Shore Drive, Waterford, CT
Thomas W. Hatfield, 24 Center St., Noank, CT
Capt. J.J. Hawkins, SO Submarine Base, New London, CT

LOCAL INTERESTS

Samuel B. Hellus, Cedar Road, West Mystic, CT
Thomas F. Horan, Jr., 5 Beach St., Waterford, CT 06385
Thomas S. Hull, 262 Pequot Ave, New London, CT
Carlton D. Hunt, Marine Sciences Institute, Avery Point, Groton, CT 06340
Catherine Jenssen, Munnatawket Rd., Box 214, Fishers Island, NY 06390
Everett N. Jones, 4 Prospect St., Mystic, CT
John R. Kirkland, U.S. Coast Guard Academy, New London, CT
Charles and Michele Kripps, 48 Richards Grove Rd., Quaker Hill, CT
Daniel J. Larkin, SUNY, Stony Brook, NY 11790
Frederick J. Lavoureux, Naval Under Water Systems, New London, CT
Percy T. MacDonald, 29 Rockwood Dr., Waterford, CT
Capt. Herbert I, Mandel, 70 Greenway Rd., New London, CT 06320
Capt. Les Marsh,70 Dean Rd., E. Lyme, CT
Richard C. Michonski, 310 Nor Nldn Tpk, Montville, CT
Arthur E. Morecraft, 26 Federal Plaza, NY, NY 10007
Ronald Munro, 39 Peqasus Drive, Groton, CT
Donald L. Murphy, 21 Gorton St., New London, CT 06320
Anrew J. Nolwalk, RFD #3, Norwich, CT
Nestor A. Nelson 1000 Hartford Tpk, Waterford, CT 06385
Thomas A. Parrott, Fishers Island, NY
Anna T. Phelps Route 102 West Greenwich, RI
Donald K. Phelps, RFD #3, Victory, Hwy., West Greeniwh, RI
Driwght Quigley, Harrison Landing, Quaker Hill, CT 06373
Natalie R. Raffery, Fishers Island, NY
E. Allan Reed, Abasana Hill Rd., Chepachet, RI
LCDR Edward Roe, USCG, Coast Guard Station, Fort Trumbull, New London, CT
Raymond J. Rolorf, 275 Windsor St., Hartford, CT
Mrs. Thoms N. Russell, Jr. Fishers Island, NY 06390
John L. Shelburn, 417 Mohegan Ave., Waterford, CT
Martha Smith, 12 Indianola Rd., Black Pt., Niantic, CT
William C. Spicer, Jr., 930 Shennecossett, Groton, CT
William Spicer, III, Harbor View Terrace, Stonington, CT
J. N. Spillane, 147 High St., Mystic, CT 06345
V.S. Spinella, P.O. Box 215, Fishers Island, NY
Fred Staples.189 H ynes Ave., Groton, CT
Richard J. Stark, 26 Plant St., Groton, CT
Leonard J. Stasiukiewicz, P.O. Box 730, Narragansett, RI
T. W. Stedman, Fishers Island, New York,
Robert Steele, M.C., Forest View Drive, Vernon, CT
Dr. Lance Stewart, 6 Pearl St., Noank, CT
Kenneth Stobes, RFD 8, Box 48, Gales Ferry, CT
Peter Stuart, Esq. 26 New London Road, Mystic, CT
Sharon, F. Sullivan, 213 Capstan Ave., Mystic, CT
Mrs. Agnew TAlcott, Sill Lane, Oly Lyme, CT
D. S. Tolderlund, Sill Lane, Old Lyme, CT
Albert G. Turner, 388 Yetter Road, Mystic, CT

LOCAL INTERESTS

John Zammit, New York District, Corps of Engineers 26 Federal Plaza, NY, NY
Dr. David R. Zoellner, 149 Linnoore St., Hartford, CT 06114
Edward A. Zuraw, 227 Old Brim Rd., Ledyard, CT

POST OFFICES

Postmaster, Uncasville, CT 06382
Postmaster, Montville, CT 06353
Postmaster, New London, CT 06320
Postmaster, Ledyard, CT 06339
Postmaster, Groton, CT 06340
Postmaster, Norwich, CT 06360
Postmaster, Waterford, Ct 06385

Local Interests (cont'd)

Gilbert C. Wagner, Old Military Highway, Gales Ferry, CT
Mary B. Walton, Box 307, Jewett City, CT 06351
Lt. Rogert K. Wright, Bldg. 107, Governos Island, NY 10004
Andrew R. Yerman, NY State Dept. of Environmental Conservation Bldg 40.
State University of New York, Stony Brook, NY 11790

EXHIBITS 2 THROUGH 4 OMITTED -

FOUND VERBATUM IN TRANSCRIPT

BEST AVAILABLE COPY

COUNCILMAN
JAMES F. HOMAN
Town of Southold
Cutchogue, N. Y.

Re: Thames River Dredging
Project Hearing
Greenport,-N.Y.
June 9, 1976

The Town of Southold wishes to reaffirm their opposition to the placing of spoil from this project in Long Island Sound particularly in the Fishers Island area.

The Town feels that a land disposal site or offshore dumping area would be a better alternative, and more in keeping with the best interest of the public.

Town of Southold

James Homan

James Homan, Councilman

Albert M Martocchia
Supervisor
Town of Southold
6/9/76

Copy available to DDC does not permit fully legible reproduction

June 9, 1976

STATEMENT OF THE LEAGUE OF WOMEN VOTERS OF RIVERHEAD-SOUTHOLD AT PUBLIC HEARING ON DREDGING OF THAMES RIVER, CONNECTICUT HELD AT GREENPORT, N.Y. BY U.S. ARMY CORPS OF ENGINEERS

The League of Women Voters of Riverhead-Southold has reviewed the supplement to the Environmental Impact Statement submitted by the Department of the Navy dated April 1976. We continue to oppose the use of Long Island Sound as the ultimate sump. We dispute a number of assumptions which appear in this supplement and will discuss some of these:

1. On p. 66 the heading of EP 5.57 refers to the New London site as a "Proposed Ocean Disposal Site". Yet p. 307 EP 6.403 refers to the New London site as an inland water. The Random House Dictionary defines Long Island Sound as a relatively narrow passage of water between the mainland and an island. The characteristics of Long Island Sound are not the same as those of the ocean, therefore the use of these two designations used interchangeably weaken the scientific credibility of the study.

2. The use of the phrase, "Historic dumping grounds" with reference to the New London site, assumes that once an area is used for dumping, which in this case 1943 is the earliest date, its indefinite use for this purpose is acceptable. Fig. 6-18 charts a proposed ten-year accumulation of nearly 16 million cu. yds. in the area from the Connecticut River to Narragansett Bay just from 1975 to 1985! Historically, most of the dumping at the New London site was from 1972 through 1975 which amounted to 2 million-plus cu. yds. Now it is proposed to dump 4.9 million cu. yds. by 1980. What will be the interaction or synergistic effect between, for example, any of the heavy metals and chemicals or cobalt-60 from the submarine base, the latter having a half-life of 5.2 years? What will be the

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

Copy available to DDC does not permit fully legible reproduction

stone nuclear power plants 1 & 2 plus Shoreham and Jamesport if they go into operation? Barbara Ward, the noted British economist and author writes," Inland seas can lose much of their dissolved oxygen if excessive waste disposal stimulates the growth and then the death of oxygen-absorbing algae. One of the profound problems posed by nature's "thresholds" is that the approach to the point of no return may give few if any danger signals. Red lights do not flash on in the deeps as one more species--of whose role in the total ecosystem we are completely ignorant--heads for death--we do not even know what we are losing. Even if we did, it would be too late."

3. P. A-17 states "It is anticipated that pollutants (including creosote) resulting from pier removal and possible blasting will be sufficiently diluted by the river action." We consider pollution by dilution unacceptable whether the pollutants enter the air or the water, just as use of air or water as a heat sink is unacceptable.

4. Fig. 6-8 opposite p. 1 4 depicts shellfish beds and refers to Bay Ocean Quahaugs and Bay Sea Scallops, again a strange dichotomy of designation for crustaceans of inland waters.

5. P. 17 of the Fourth Quarterly Report dated Aug. 1975- the paragraph concludes "results of the recent survey will be presented in a forthcoming annual report, which will be submitted in lieu of this quarter's report." Does this mean that further studies are still to be carried out?

6. On p. 117 we find an ambiguity in the sentence which reads, "Although the extent of environmental effects of dumping contaminated dredge spoils in the marine environment are still unknown, recent research efforts have shown that "concerns regarding the release of toxic materials into solution phase during dredging operations and disposal are mostly unfounded."

7. This supplement has assessed the various disposal sites from the primary consideration of transport cost. While cost does indirectly affect all citizens, the far greater impact on the local fishing industry and sports fisherman is regarded as a low priority. Yet it is reported that "The catch in the Fishers Island-Race is the largest on Eastern Long Island, followed by Long Sand Shoals and Cornfield Shoals." At least 20 lobstermen are in the Fishers Island area. Each tide produces approximately 100 lbs. of lobster at approximately 4,000 per man. What is the cost to the people who depend on the fishing industry for their livelihood and to the towns where they live? The assumption that dumping of spoil at New London can be considered independently of, and in isolation to the surrounding Sound waters fails to recognize the cumulative damage which will eventually cross that "threshold" of eutrophication.

Shirley L. Bachrach
League of Women Voters of Riverhead-Southold

Dayton Road
Southold, N.Y. 11971

477

Copy available to DDC does not permit fully legible reproduction

North Fork Audubon Society
a chapter of National Audubon Society

BOX 973 · MATTITUCK, L.I., N.Y. 11952

June 9, 1976

Statement to the
Division Engineer
Corps of Engineers, U.S. Army
424 Trapelo Road
Waltham, Mass. 02154

My name is Virginia Bennett Moore, I live in Southold, and I am a member of the Conservation Committee of the North Fork Audubon Society, a 400-member chapter of the National Audubon Society. I have been asked by them to make the following statement:

The North Fork Audubon Society finds no reason for the Corps to reinstate the Navy's permit to resume dumping the dredged Thames sludge at the New London dumping ground.

We have at least summarily reviewed the Navy's April 1976 draft supplement to its final environmental impact statement and, although the table of contents is authoritative and seems to ring out with environmental fairness, the contents themselves are inconclusive, contradictory, and far from reassuring. We do not find them the basis for "minimal and short term" impacts, as the Navy does. In fact, nothing, so far as we can see, has changed -- except to get a lot worse, as we'll come to in a moment.

For example, in their initial summary they say, "(R)emoval of polluted sediments from the Thames River would serve to enhance the commercial fishery by increasing the productivity of the estuary." If it can improve the river to remove the polluted sludge, how can they believe that dropping that sludge will fail to harm the living Sound? How on earth can Mr. Ravis, the second speaker, conclude that it will actually "help the New London fish?"

Copy available to DDC does not permit fully legible reproduction

They list various populations of that Thames bottom in Table 3-12 (pp 55-56) as these: barnacle shell fragments, dead gastropods, mussel shells, dead hydroid skeletons, tar, oil, dead glass sponges, angelwing shells, one bryozoan skeleton, and a few living Ulva fragments. At station 17N, no living organisms were observed. They admit (paras. 6.13 ff) that this "Thames River spoil can not be considered for beach nourishment because of the fine size and the polluted nature of the sediments," nor for sanitary landfill, nor even for strip mine reclamation. They did not deal with the cofferdam [illegible] to contain the spoil, as some of us earlier suggested. But they say that it will have no effect when thrown into the fastest channel of the Sound.

And they volunteer that (6.160), "The greatest commercial value of Long Island Sound lies in its use for sport, be it boating, sport fishing, or leisure. A very conservative estimate of the value is $10 million annually."

Now, here's the part that's worse. When the original Army permit was issued, the Navy had asked permission to dump 2.8 million cubic yards of spoil at the site over a period. Now they are planning (5.25) to dump about twice that -- 5.3 or 5.4 million cubic yards at the site -- not all of it Navy. Most of this unforgiveable despoliation (5.36) would take place before 1980. And 1976 -- our bicentennial year -- would be the most active year.

In short, the Navy seems to be saying that because New London has been a dumping ground for 40 years (with the Sound deteriorating every year), and there's no other convenient place to put this mess, we're stuck with it.

We urge the Corps to refuse to reinstate this permit, and to remember that not only they but the EPA (4.11) have a distinct legal obligation to protect us from unacceptable adverse effects on
--shellfish beds and fishery areas
--effects on submerged vegetation
--effects on food chains and species diversity
--effects on the movement of fauna
--degradation of aesthetic, recreational and economic values

in this case far more than the estimated $10 million worth of those values.

Statement for U.S. Army Corps of Engineers/ U. S. Navy
Public Hearings, Thames River Dredging and Spoil Disposal.
Greenport, N.Y. on 9 June 1976

Statement of Charles D. Hardy
Taxpayer, Southold, N.Y.

Since May 1973, the U.S. Navy has submitted a series of draft environmental impact statements, final impact statements (FEIS) and now supplements to final impact statements concerning the proposed New London Dumping Ground Project. This series of statements have won the approval of federal agencies charged with responsibility of protecting the quality of our coastal waters. However, these statements to the present time have not withstood legal actions brought by concerned citizens who correctly assessed that glaring deficiencies existed in these documents. The United States Court of Appeals for the Second Circut (Docket No. 75-7048) ruled (9 Sept. 1976) that the Navy's environmental impact statement failed to satisfy the spirit and intent of both the National Environmental Policy Act of 1969 and the Federal Water Quality Amendments of 1972. In short, the U. S. Navy with the approval of the Corps of Engineers and the Environmental Protection Agency broke the law.

One stipulation of several made by the U. S. Court of Appeals ordered the Navy to "make a genuine effort in a truly objective fashion to evaluate and compare the qualities of all containment sites and to select one on the basis of clearly stated data and r reasoning." I respectfully submit that this supplement to the Final Impact Statement is in contempt of the above quoted section of the Court's decision for reasons I would like to briefly outline.

An atmosphere in which data can be evaluated in an"objective fashion" can only be created where the clouds of conflict of interest are absent. Such is not the case in the monitoring study which was conducted at the New London Dump Site. Here we find that the principal investigator of the prime contractor of the study, the National Marine Fisheries Service, Sandy Hook Laboratory, is also chairman of the Interagency Scientific Advisory Subcommittee on Ocean Dredging and Spoiling. This committee was established to make recommendations to the Corps of Engineers of acceptable dredge spoil dumping areas and also to make recommendations to the nature and extent of the sampling and monitoring to be carried out. Such

a situation in which the prime contractor, who is being financially reimbursed for his services to the tune of many hundreds of thousands of dollars, also is strategically placed to serve as ~~disinterested~~ referee, consultant and reviewer in the design, execution and tone of the investigation. Under such an incestuous closed loop system under the guise of objectivity, the pressures for human bias are enormous. The design, implementation and conduct of acceptable scientific investigations requires peer review from outside the system.

One premise made by the Navy is the belief that the New London Dump Site is a containment site where environmental conditions exist which preclude the dispersal of the spoil beyond the boundaries of the dumping area. A containment site is necessary for this particular dredging project since the spoils are catergorized as polluted by failing to satisfy dredge spoil disposal criteria of 1971 or Ocean Dumping Criteria of 1973 established and regulated by the Environmental Protection Agency. However, in all the data submitted to date, the Navy has failed to establish that the New London Dump Site is a containment site "on the basis of clearly stated data and reasoning" as ordered by the U. S. Court of Appeals. In fact, what little and inadequete data of currents supplied by the Navy indicates that the New London Dump Site is dispersive. Whether the dump site is dispersive or contained hinges largely upon the intensity of currents and turbulence to erode sediments placed at the site. The Navy using data and conclusions of an alleged and unpublished report by Morton et al. (1975) claimed that a bottom velocity of 1.72 ft/sec is necessary to erode the dredge spoils characterizing the Thames River. If we accept this critical velocity as valid it should be a simple matter to implement a routine study of currents using a moored array of current meters for periods of not less than one month at different seasonal periods. This is a common procedure ~~xx~~ for studies of this nature and commonly performed by recognized scientists. The Navy has submitted no data that this was performed. The Navy did not include the alleged current meter data collected by Morton et al at the New London Dump Site in their Final or Supplement Impact Statement. The Navy did base their conclusions that the New London Dump Site was a containment area on Morton et al study while at the same time ignoring data that was supplied in the impact statement.

However, bottom current velocities of $1\frac{1}{2}$ to 2 knots were reported by subcontractors to the study, University of Connecticut SCUBA divers(P-14, Vol. 3; Suppl. to FEIS), which is equivalent to 2.5 to 3.4 ft/sec. This exceeds the critical velocity necessary for erosion and dispersal of the dredged spoils as determined by the Navy's own consultants. Current meter measurements of a few hours to a day duration by the New York Ocean Science Laboratory, acting as subcontractors to the monitoring study, were apparently ignored by the Navy in the final analysis and assessment of the Impact Statement. These summarized data are given however in the FEIS supplement. These current meter records show that maximum current speeds of 56 to 61 cm/sec were observed which are equivalent to 1.8 to 2 ft/sec. Such speeds again exceed the critical erosive velocity. It must be pointed out that both the SCUBA observations and the current meter data were all observed during optimum sea conditions. Measurements of current speeds at the dump site under adverse wind and wave conditions have never been measured by the Navy or its consultants. The embarassingly small and limited current measurements revealed by the Navy clearly indicate that erosive velocities do exist at the New London Dump Site. Failure of the Navy to note this in the FEIS supplement is a direct affront to the ruling of the Court of Appeals that the Navy select a site "on the basis of clearly stated data and reasoning."

We must now address the contention of the Navy that the dredged spoils dumped at the New London Dump Site have shown little if any evidence of dispersion during the period of monitoring. This phenomenon was predicted by Dr Bohlen of the University of Connecticut in testomony opposing the dumping project. Dr Bohlen stated that the manner of barge dumping used deposits the dredge spoil in a cohesive pile. Due to the polluted nature of the spoil it will take some time before burrowing marine organisms begin to breakup the spoil deposit. The period of the monitoring survey was much too short for the combined action of increasing biological activity in concert with the high maximum current speeds to sweep these polluted spoils westward into Long Island Sound.

The Navy would do better to consider locations which offer environmental characteristics more fitting to the designation of containment. Such locations appear to exist in Rhode Island and Block Island Sounds and southeast of Block Island.

NFEC INC
NORTH FORK ENVIRONMENTAL COUNCIL, INC.
Box 311, Southold, New York 11971

June 9, 1976

Division Engineer
Corps of Engineers
424 Trapelo Road
Waltham
Massachusetts - 02154

Gentlemen:

We are happy tonight to comment on the Draft Supplement to Final Environmental Impact Statement to Dredge the (Thames) River Channel of the Naval Submarine Base in New London. I make these comments on behalf of the North Fork Environmental Council, which consists of over four hundred members and represents many citizen groups on Long Island's North Fork.

We feel that environmental considerations are important in modifying projects such as this, but we realize that economic and national security considerations must also play an equally important role. Consequently, we adopt a cooperative spirit in replying to the Draft Supplement - Final Environmental Impact Statement. Our major criticism of the Draft Supplement is based on the following points:

1. We wonder how effective the reevaluation of data will be following the completion of the NAVSUBBASE dredging. It is far too simple to use the same dump site rather than to dump selectively, or choose alternative means of spoil disposal. This reevaluation becomes particularly important in the light of current studies on dumping management by the Marine Resources Research Center group under Dr. Schubel at SUNYSB.

2. Clearly, the need for oil spillage corrections and sewage disposal improvements are indicated (at the BASE and on the Thames overall). Is there sufficient impetus to carry these programs

Copy available to DDC does not permit fully legible reproduction

Copy available to DDC does not
permit fully legible reproduction

Division Engineer
Corps of Engineers
424 Trapelo Road
Waltham
Massachusetts - 02154

out, or will we have to accept delays and foot-dragging and more polluted spoils to handle?

3. We are dismayed by the fact that there is still no bi-state organization with clear-cut jurisdiction to deal with a problem such as this.

4. We object to the spirit with which ocean dumping is simply accepted and alternative means are dismissed on economic grounds. It is ironic to read of dumping sites considered under the provisions of the Marine Protection, Research, and Sanctuaries Act! Recent research in the New York Bight and the Hudson River are proof that ocean dumping may not be acceptable on a large scale as a long term method of waste disposal.

Our section-by-section critique is as follows:

3.32 - What plans are now in effect to abate oil pollution originating from the NAVSUBBASE?

3.36 - Have any changes in PCB levels been detected recently? These ought to be monitored carefully in the light of recent events on the Hudson. What are detection limits? 500-700 ppb doesn't seem all that low for PCB levels! (Table 3-6).

3.38 - What improved methods are proposed for fuel and waste handling and transfer?

3.39 - and 3.45 - Sections indicate problems from shipboard wastes. What steps will be taken? Have ship-to-shore connections been completed?

3.46 - This section quotes "extreme adverse environmental conditions existing in the river sediments". One certainly has doubts about long term and large scale dumping on that basis.

Copy available to DDC does not
permit fully legible reproduction

Division Engineer
Corps of Engineers
424 Trapelo Road
Waltham
Massachusetts - 02154

Page 3

3.64 - What are the margins for error in the spoil pile calculation? It sounds simplistic for a thirty foot spoil layer to remain motionless! Diffusion of soluble contaminants away from the site could be a problem over a long time period, e.g. (3.54) sea water samples with the order of 100 ppb Pb concentration were found in elutriate analyses.

4.15 - This section and following sections describe the problems of jurisdiction. A Bi-State Organization should be empowered to deal with the dredging operation.

5.10 - Could the dredging schedule be curtailed to allow for winter flounder spawning (approx. mid-March to the end of April)?

5.15 - and 5.36 - Additional dredging projects 2.5 million cubic yards by 1985 and up to 5.3 million cubic yards mentioned as the ultimate number. What will prevent this number from growing tenfold?

6.11 - thru 6.51 - These means of disposal ought to be encouraged even if costs ARE higher, and they should be brought into play as quickly as possible.

11.06 - The conclusion seems to blithely accept indefinite oceam dumping "Under provisions of the Marine Protection, Research, and Sanctuaries Act". Surely that Act was not intended to encourage this process!

We thank you for the opportunity to appear this evening, and hope that we will be asked to comment further on programs such as this one.

Sincerely,

NORTH FORK ENVIRONMENTAL
COUNCIL, INC.

Merlon E. Wiggin

Merlon E. Wiggin
President

(OVER)

IN SUMMARY AND CONCLUSION, WE ASK YOU TO GIVE MORE THAN LIP SERVICE TO THE INTENT OF THE APPLICABLE ENVIRONMENTAL LAWS AND ACTS, BUT INSTEAD, CHARGE YOURSELVES AS REPRESENTATIVES OF THE UNITED STATES GOVERNMENT TO ACT COURAGEOUSLY AND WITHOUT HESITATION TO EQUALLY DEFEND AND PROTECT OUR ENVIRONMENTAL AND NATURAL RESOURCES AS A HERITAGE IMPORTANT TO ALL OF US.

Jim

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

June 10, 1976

Commanding Officer
U. S. Department of the Navy
Northern Division
NAVFACENGCOM
Code 09BE
Philadelphia, PA 19112

Dear Sir:

We have received and are reviewing the Draft Supplement to the Final Environmental Impact Statement, "Dredge River Channel", Naval Submarine Base, New London, Groton, Connecticut.

Although comments are due to you from this Agency on June 15, 1976, we feel that more time is needed in order to thoroughly review and comment on the impact statement. We, therefore, respectfully request an extension of the commenting period to July 2, 1976.

We hope such an extension will not inconvenience you. Thank you for your consideration.

Sincerely yours,

Wallace E. Stickney

Wallace E. Stickney, P.E.
Director, Environmental
Policy Coordination Office